

NETWORK WORLD

THE WEEKLY FOR LEADING USERS OF COMMUNICATIONS PRODUCTS & SERVICES

VOLUME 4, NUMBER 50

DECEMBER 14, 1987

► SYSTEMS INTEGRATION

New Nynex unit serves big users

Subsidiary to sell services, equipment.

BY KARYL SCOTT

Washington, D.C. Correspondent

NEW YORK — Nynex Corp. last week announced the formation of an unregulated subsidiary called Nynex Systems Marketing Co. (NSM) that will market telecommunications services and information systems to 5,000 of Nynex's largest business customers in the northeastern U.S.

Based here, NSM will serve as a single point of contact for major user companies that want to procure telephone services or equipment sold by any of the Nynex

companies. For example, NSM will market transmission services of New England Telephone Co. and New York Telephone Co., and telecommunications and computer equipment from Nynex Business Information Systems Co.

NSM will also design, install and maintain complete networking systems for large clients. NSM officials said Nynex's 300 to 400 largest users will each be served by an account manager.

Donald Sacco, NSM's newly appointed president, told *Network World* the subsidiary was formed in response to customer demand

Nynex caters to the corporate elite

- More than half of the Fortune 500 companies
- Eight of the top 10 commercial banks in the U.S.
- Nine of the top 10 diversified financial institutions in the U.S.
- Six of the Big Eight accounting firms
- The New York and American Stock Exchanges

NYNEX
SOURCE: NYNEX CORP., NEW YORK

for one-stop shopping, as well as growing competition from companies such as AT&T and IBM that are increasingly acting as systems integrators for their major business accounts.

See page 54

► LAN BRIEFING

IBM claims Token-Ring sales soar

BY PAUL KORZENIOWSKI

Senior Editor

During a series of briefings outlining its local networking strategy last week, IBM said its Token-Ring Network has emerged as the network of choice among large corporations and that sales of Token-Ring adapter cards will double in 1988.

While IBM declined to provide actual Token-Ring Network shipment figures, officials said demand for the adapters has increased steadily since shipments began in 1986, a claim that industry ana-

See page 55

SPECIAL SECTION

Sophisticated tools aid LAN managers

BY MARVIN CHARTOFF

Special to Network World

In the earlier days of local-area networks, communications managers could usually initiate some sort of quick fix when network problems surfaced.

But new local net technology has complicated managers' lives. No longer can they run down the hall, jiggle a few connectors and bring the network back up. Sophisticated local-area net management tools are needed to handle network problem management, capacity planning and administrative functions.

Continued on page 37

► LOCAL NETWORKS

Novell details OS/2 support

Firm's NetWare focus complicates connectivity.

BY MARY PETROSKY

West Coast Correspondent

NEW YORK — Committed to maintaining its own network operating system and faced with the need to support the advanced networking capabilities of IBM's OS/2, Novell, Inc. late last week detailed how it will ensure coexistence of NetWare and OS/2.

At a briefing here, Novell outlined its strategy for supporting OS/2 on both network workstations and NetWare-based servers, saying it will support server-based OS/2 applications via a coprocessor

for the server. Analysts split on how effective they think that solution will be.

Novell also announced it will support IBM's Network Basic I/O System and LU 6.2 as the transport mechanisms for these applications.

In addition, Novell repeated its pledge to support OS/2 Standard and Extended Editions on workstations and to provide compatibility with IBM's OS/2 LAN Server by supporting the products' application interfaces. This will allow NetWare to run all OS/2 applications, including such things as distributed data base management.

See page 53

NETWORK LINE

News

► The RBHCs review their holdings in the wake of Judge Greene's order banning equipment design and development. Page 2.

► The US Sprint users

group presents the carrier with goals it expects the company to meet on the road to improving service. Page 2.

► IBM weaves Rolm more tightly into the Blue fabric, saying the switch maker will become an IBM division at the end of the year. Page 2.

► The Department of Defense's decision to support the ANSI X.12 EDI standard adds new momentum to the snowballing X.12 movement. Page 4.

► Western Union today reveals results of a shareholder vote on a restructuring plan that could spare the company from bankruptcy. Page 6.

Features

► LAN security is not just a matter of technology; it also depends on human factors. *Network World* examines the ways to make LAN security more people-compatible. Page 34.

► HIGH-SPEED NETWORKS

Sun Trust Services puts faith in fiber

BY JIM BROWN

New Products Editor

ORLANDO, Fla. — Sun Trust Services Corp. has side-stepped more costly leased T-1 service and ensured excess capacity for network growth by linking two buildings here with a private, 45M bit/sec fiber-optic link.

Sun Trust Services, which provides data processing support for Sun Banks, Inc. in Florida, SunTrust Banks, Inc. in Georgia and Third National Corp. in Tennessee, had the quarter-mile underground link installed between its data center and its new operations center here six months ago.

The \$120,000, point-to-point fiber link can support 28

See page 53

► **RULING REACTION**

RBHCs review holdings after Greene order

BY KARYL SCOTT
Washington, D.C. Correspondent

WASHINGTON, D.C. — Still reeling from the recent order banning them from telecommunications equipment design and development, the regional Bell holding companies last week reviewed their holdings for violations.

As the implications of the order began to set in, the RBHCs carefully examined their postdivestiture acquisitions and joint business ventures to see if any activities violate U.S. District Court Judge Harold Greene's order clarifying the Modified Final Judgment.

In the order, released on Dec. 3, Greene wrote, "The manufacturing restriction embodied in the decree prohibits RBHC design, development and fabrication of telecommunications products and customer premises equipment."

Greene explained that the manu-

facturing ban was designed to prevent the type of anticompetitive practices the Bell System allegedly engaged in prior to the breakup of AT&T. For example, manufacturers had difficulty obtaining technical specifications from the Bell System that would enable them to design products for interconnection with AT&T's network.

The Department of Justice contemplated its response to Greene's order last week. According to Barry Grossman, communications section chief at the Justice Department, "We don't know what the next step will be. We intend to investigate the RBHCs' unregulated subsidiaries and examine potential MFJ violations."

Grossman said the investigation would include the examination of complaints filed by AT&T and other industry associations charging various RBHCs with violations of the manufacturing ban.

In the meantime, there are several actions the RBHCs can take, Grossman said. "They could sell their interests in companies that are involved in the development of telecommunications equipment," he said. "They could appeal Greene's order, or they could wait for someone to file new complaints." Prior to Greene's recent ruling, the RBHCs assumed the manufacturing restriction did not extend to research and development activities. For this reason, some companies entered businesses they may now have to divest.

Ameritech, for example, paid David Systems, Inc. — a manufacturer of fiber-optic local networks — \$5 million to develop a central office-based local-area network.

"We funded the development of a central office LAN, which is now in the test phase," said Mike Brand, Ameritech's manager of media relations. "The Department of Justice approved that venture, but we have two other options under our agreement with David Systems that could be jeopardized by Greene's recent order."

With the first option, if the central office local net development

See page 54

► **LONG-DISTANCE**

Users set goals for US Sprint

Group files plan to improve service.

BY MICHAEL FAHEY
Senior Writer

KANSAS CITY, Mo. — At its recent meeting here, the US Sprint National Account Users Association presented the long-distance carrier with a series of interim goals it expects US Sprint to reach on the road to ironing out its billing and circuit-provision woes.

According to Joe Gallo, chairman of the US Sprint National Account Users Association steering committee, "Robert Snedaker [President of US Sprint Communications Co.] has stated that he wants the billing system straightened out by January 1989. He has stated publicly that heads will roll if that is not accomplished. The Users Association is looking for benchmarks along the way to assure us that the process is indeed occurring."

The group wants the time between the end of a billing period and the arrival of bills reduced by Sprint to a period of between 15 and 20 days. The company has promised that by January 1989, it will deliver bills to customers within 10 days after the closing of the billing period.

"It usually takes us 30 days to see a bill," said Gallo, who is also communications manager for Automatic Data Processing, Inc. "MCI will usually issue a bill in 10 to 12 days." US Sprint was unavailable for comment.

Also at the meeting, the Users Association requested that US Sprint speed delivery of credit owed to customers who have been overbilled. "In the past, approval for a credit as little as \$100 or \$200 has had to go to a vice-president," Gallo said. "The process can take six months. We'd like to see it improved to 60 days first, and then to 30 days by January 1989."

He said US Sprint users have seen an improvement in the installation of dedicated circuits, but he urged further improvement.

"Sprint was averaging in the neighborhood of 60 days to install a dedicated circuit," Gallo said. "AT&T has been averaging 30 to

See page 52

► **PBX INDUSTRY**

Rolm to become an IBM division

BY MICHAEL FAHEY
Senior Writer

ARMONK, N.Y. — IBM announced last week that wholly owned subsidiary Rolm Corp. will become an IBM division called Rolm Systems Division (RSD) effective Dec. 31, marking another step in IBM's absorption of the switch maker.

In effect, Rolm, which was purchased by IBM for \$1.5 billion in 1984, has been operating as a research and development and manufacturing division of IBM since March 1987, when its U.S. direct sales, service and support organizations were transferred to IBM's Information Systems Group.

A month later, IBM executive Ray AbuZayyad was named president of Rolm, replacing Dennis Paboojian. As part of the latest move, AbuZayyad was appointed president of RSD. He will report to IBM vice-president Terry Lautenbach, group executive of IBM's recently renamed Information Systems and Communications Division.

RSD, according to IBM, "will be responsible for worldwide manufacturing, except in Europe, and worldwide development of a portion of IBM's telecommunications products. Those products include digital business communications systems such as integrated voice and data controllers, digital telephones, voice-messaging systems, telephony and network applications and desktop products, including integrated voice and data terminals."

IBM said RSD will maintain its headquarters and its manufacturing and development facilities in

Santa Clara, Calif.; its manufacturing and development facilities in Austin, Texas, and Colorado Springs; and its development facilities in Boca Raton, Fla.

The latest move puts RSD at the same corporate level as IBM's Communication Products Division (CPD) in Research Triangle Park, N.C. Currently, CPD, headed by Ellen Hancock, is primarily involved in the development and manufacture of data communications products. IBM would not comment on how it will coordinate communica-

tions products development efforts between RSD and CPD.

Analysts generally agreed with an IBM spokeswoman who described last week's move as "a change in name only." Frank Dzubek, president of Communications Network Architects, Inc., a Washington, D.C.-based consulting company, said formation of RSD is just the latest in a series of moves by IBM to take greater control of Rolm and to mold the switch maker in its own image. "The biggest changes

See page 52

Table of contents

TOP NEWS

At the behest of the GSA, the Justice Department investigates possible criminal misconduct on the part of GSA officials in the awarding of \$55 million in switching contracts. **Page 6.**

INDUSTRY UPDATE

ATM network use increases 11% in 1987, and debit card use is beginning to take off. **Page 7.**

TELECOM TRENDS

Foxboro Co.'s nationwide SDN, which links 40 branch offices to its headquarters, will save the company big money. **Page 15.**

DATA DELIVERY / NET MANAGEMENT

Florida merges its voice and data

networks into an integrated system. **Page 17.**

LOCAL NETWORKING

Action Technologies pushes its Message-Handling Service as an industry standard for distributed PC applications. **Page 19.**

COMMUNICATIONS MANAGER

TCA's new president, Jerry Appleby, will oversee the start of the users group's five-year expansion plan. **Page 23.**

NEW PRODUCTS AND SERVICES

DEC-to-Apple connectivity was one of the hot topics at last week's DEXPO West 87 in California. **Page 25.**

FEATURES

Page 34.

CALENDAR

Page 55.

Network World wants to make its news coverage even better, and for that we ask your help. If you know of an interesting event that just occurred or is about to occur, please call. We'd also like to know how you optimize your networks. Call Editor Bruce Hoard toll free at (800) 343-6474.

► **MULTIPLEXER MARKET**

Codex beefs up line with time-division mux

Model 6228 supports 56 channels.

BY JIM BROWN

New Products Editor

CANTON, Mass. — Moving to strengthen its presence in the time-division multiplexer arena, Codex Corp. last week introduced a new digital multiplexer capable of supporting up to 56 asynchronous or synchronous channels over two aggregate links.

Beta user Texaco U.S.A., Inc. said it was pleased with the operation of the unit and is considering installing a number of them in its nationwide point-of-sale network.

Codex's 6228 Digital Transmission Multiplexer is actually two multiplexers in the same enclosure, said Mike Phelan, product manager. Each of the unit's aggregate links, which can operate at speeds ranging from 48K bit/sec to 256K bit/sec, are capable of supporting 28 lower speed channels. For example, the unit can be configured to support either two 56K bit/sec aggregate lines or one 256K bit/sec aggregate line.

In addition to supporting point-to-point transmission via such services as AT&T's 56K bit/sec Data-phone Digital Service (DDS), the 6228 can be used to feed T-1 multiplexers that form a corporate backbone network. The product also supports new loop-back testing capabilities and alarm reporting not supported by Codex's current time-division multiplexers. In Codex's product line, the new model is positioned above the 6216,

which supports 16 channels over a single aggregate link operating at up to 256K bit/sec. Codex also released new hardware that adds the enhanced network management capabilities of the 6228 to the 6216.

The 6228 underwent a four- to six-month beta test in Texaco's point-of-sale network. Texaco has card-reader terminals in gas stations that are linked to its Bellaire, Texas, data center. Those terminals process credit card transactions.

A communications analyst for Texaco who asked not to be identified said a 6228 in New York state

is being used to multiplex 25 2,400 bit/sec lines coming in from stations throughout New York and New England. The 6228 is linked to a second unit in Bellaire via a single 56K bit/sec line.

Texaco used the 6228 to replace a Codex 6216. The communications analyst said Texaco has been so pleased with its performance the company is considering installing more of them. "We currently use about five or six 6216s. There are two or three places where we have higher volume traffic than the 6216 can support. We will probably install 6228s in those locations," he said.

Traditionally a leader in the statistical multiplexer market, Codex is paying a little more attention to the time-division multiplexer market in the wake of reports that a considerable drop in the cost of leased 56K bit/sec DDS service will attract new users to the service, analysts said. Analysts also said

the new unit can fit the growing need for submultiplexers that can feed backbone T-1 networks.

"Time-division multiplexers, as parts of T-1 or digital networks, are a logical step for Codex because that is where the market is going," said Rick Villars, an analyst with Framingham, Mass.-based International Data Corp.

According to Barry Gilbert, vice-president of Comm/Surv Research, a division of The Market Information Center, Inc. of Marlborough, Mass., "The time-division multiplexer market is becoming more desirable for users, and Codex had not been too active in it. But this will help it round out its time-division multiplexing product line."

Codex said the 6228 is currently available for \$4,975. A 6216 supporting enhanced network management features is priced at \$3,545, and the price for a standard 6216 has been dropped from \$3,800 to \$2,895. ▮

► **TAKEOVERS**

Telex endorses bid from Memorex

BY JOSH GONZE

Staff Writer

TULSA, Okla. — The usually tranquil 3270 terminal market drew industry attention last week when Telex Corp., looking to escape a hostile takeover by New York investor Asher B. Edelman, endorsed a friendly buyout bid from archcompetitor Memorex International N.V.

Memorex's bid for Telex is valued at approximately \$911.4 million. Analysts said a Memorex/Tel-ex merger would benefit both companies.

But privately owned Memorex

may not be able to convince any financial institutions to back the deal, since the company already has \$550 million in debt incurred during a leveraged buyout, which is when assets of a company are used as collateral.

Telex has been fending off an unsolicited takeover bid launched by Edelman in October. The company fears Edelman would sell off some portions of Telex.

Telex agreed to respond officially to Memorex's bid by Saturday at 6 p.m., after *Network World's* press time. In a written statement, however, Stephen J. Jatrass and George L. Bragg, Telex's chairman and

president, respectively, said, "We believe the synergies resulting from a combination with Memorex would be advantageous to both companies and their customers, and the board of directors will consider Memorex's proposal very carefully."

Besides IBM itself, Telex is the largest vendor of IBM 3270-type products, with about a 16% share of shipments in 1986, according to International Data Corp. (IDC), a Framingham, Mass., market research firm. Terminals and controllers are its most important 3270 products.

See page 54

► **DIGITAL DATA SERVICES**

Users differ on 19.2K

BY JOSH GONZE

Staff Writer

Judging from user reaction last week, the 19.2K bit/sec digital data services that AT&T and at least three of the RBHCs may launch as early as next year would be well-received, but would not tempt analog users into the digital world.

Network managers at companies currently using 9.6K or 56K bit/sec digital data services told *Network World* that availability of 19.2K service would be a boon to them. But users with a large installed base of analog modems and a desire to retain control over network management said they have little interest in the emerging service.

AT&T and the regional Bell holding companies are eager to bring 19.2K digital data services to market because digital circuits are more profitable and easier to troubleshoot than analog circuits ("Carriers mull new 19.2K DDS plan," *NW*, Nov. 23). Digital data

service is already available in most regions at other common transmission rates, including 2,400-, 4.8K-, 9.6K- and 56K bit/sec.

William Wittig, manager of telecommunications at Allen-Bradley Co., said his company could use 19.2K service to replace both 14.4K bit/sec analog lines and underutilized 56K bit/sec digital circuits. "If the pricing was right, we'd be happy to see something in between [9.6K and 56K]. In some cases, what we've used for a filler is a 14.4K analog, which we don't really feel is desirable, but, sometimes, that's all you can do," he said.

Wittig warned that even for Allen-Bradley, which is already a large digital data service user, it would be important for the new service to be available nationwide and not just within territories of selected RBHCs.

Implementation of 19.2K digital services would be relatively easy, because most data terminal equipment (DTE) features RS-232 connections that support line speeds

up to 19.2K bit/sec, Wittig said. That would enable most existing equipment, such as IBM 3174 and 3274-type terminal controllers, to work with 19.2K services without expensive hardware replacements.

"Whether you're running at 9.6K or 19.2K, it's all the same. If you go to 56K, you have to change out some hardware," he said.

CompuServe, Inc., a value-added network (VAN) provider based in Columbus, Ohio, sees several potential uses for 19.2K bit/sec service, according to William DuVall Jr., vice-president of network operations. "There are certain cases where 19.2K digital would look real nice to us," he said.

The company currently uses a mixture of digital, 14.4K bit/sec analog and satellite links to support its network. "The reason we're using analog circuits is that we have an embedded base of modems. We've been pushing that out to the periphery of the network as things get faster and faster," DuVall said.

For CompuServe's network, 19.2K circuits might be used to tie customer mainframes into the VAN's backbone network and to link areas with low data traffic.

"We would envision using this offering in smaller locations, where we don't have that many simultaneous users," DuVall said.

"It's a jump from straight 9.6K to 56K, and we always look for some steps in there," he added.

Richard Colby, manager of corporate telecommunications at Johnson Controls, Inc., said he would like to use digital data service for its superior reliability and throughput, but the cost of dial backup for the service is too high. The company is currently converting its 9.6K analog circuits to 16.8K and 19.2K bit/sec analog circuits to meet bandwidth requirements, but is not considering 19.2K digital service because, Colby explained, "As soon as you start talking about a [digital data service] circuit with dial backup, the cost just gets out of sight."

Compatibility with existing DTE is not a problem for 19.2K service, Colby agreed. "The only things we would need to do would be to throw our modems away and get a [data service unit/channel service unit] instead. Most of our lines either go into 3270-type controllers or to System/36s or System/38s, See page 53

► **ELECTRONIC DATA INTERCHANGE**

X.12 gains momentum with DOD endorsement

BY JOSH GONZE

Staff Writer

WASHINGTON, D.C. — Announcement of the Department of Defense's decision to support the ANSI X.12 electronic data interchange (EDI) standard will add further momentum to the already snowballing X.12 movement, EDI proponents said last week.

Other federal agencies may adopt X.12 in the wake of the Defense Department's move to embrace the standard, a move announced at the 1987 National EDI Systems Forum and Exhibit held here two weeks ago.

"When the Department of Defense adopts a standard, most of the other federal agencies fall right in line," said Hal McDonald, a specialist in information systems and data processing at 3M Corp.

"That is of great importance, since many of us do business with the government. Those strongly supportive of X.12 were really happy to hear the announcement," said McDonald, who is also chairman of the ANSI X.12B subcommittee on data maintenance.

EDI is broadly defined as the computer-to-computer exchange of data for business transactions, such as invoices and purchase orders. Most EDI network operators currently use proprietary and often industry-specific formats for business documents. However, as

EDI grows in importance, more users are considering use of the X.12 standards, which provide templates for EDI transactions.

About 2,000 people attended the EDI trade show, up from 1,400 at last year's show. Attendees packed the 190 exhibit booths and 60 workshop sessions. Speakers said attendees were more knowledgeable about EDI than in past years and that many workshop participants had begun pilot EDI projects at their companies.

"The basics seemed less important this time around than some of the more advanced aspects of EDI. Attendees were asking business and strategic questions," said Charles Kosy, a senior technical consultant at General Foods Corp. and co-speaker at a workshop on the Uniform Communications Standard, an EDI format used in the grocery industry.

Further evidence of EDI's increasing acceptance came when a high-ranking IBM executive, delivering the show's keynote, emphasized the company's commitment to EDI. But some keynote attendees were critical of the speech given by Edward E. Lucente, vice-president and group executive of IBM's Information Systems and Communications Group. "My impression, and the impression of several people, was that he gave a sales pitch for IBM, and that was not what people were expecting to hear.

People had been expecting him to talk about what's going on in the EDI world," 3M's McDonald said.

Another important development was Digital Equipment Corp.'s participation on the exhibit floor and its statement of intention to market products targeted to the EDI market, according to Victor Wheatman, manager of EDI planning services at Input, a Mountain View, Calif., consulting firm. "Until this announcement, only IBM and Control Data [Corp.] have been providing software for EDI. It's been only independent software companies."

Wheatman said DEC's exhibit was unusual in that it displayed EDI software requiring a dedicated VAX minicomputer. "It was kind of a revelation to me that the hardware companies expect that, in high-transaction environments, users should dedicate a processor to EDI," Wheatman added.

About one year ago, DEC established an internal committee of senior vice-presidents to assure that DEC was giving the proper focus to EDI. The committee is currently working with its major accounts under nondisclosure agreements to develop customized EDI solutions, according to William Carlisle, EDI marketing manager at DEC.

While most of the workshops at the show examined industry-specific EDI applications, some of them looked ahead to new business environments in which EDI could be used. For example, paper transactions related to deliveries at grocery and retail stores may soon be replaced by EDI, according to Richard C. Norris. Norris was the speaker at a workshop on direct store delivery and is practice

See page 52

► **NATIONAL ADVANCED SYSTEMS**

NAS VAX links debut

BY JIM BROWN

New Products Editor

SANTA CLARA, Calif. — Hoping to boost sales of its IBM-compatible mainframes, National Advanced Systems, Inc. (NAS) last week introduced software and hardware that link its AS/XL and AS/VL systems to Digital Equipment Corp. DECnets.

NAS, a subsidiary of National Semiconductor Corp., is targeting the first releases of its Cross Systems Series of products at engineering and scientific users with existing DECnet networks that need access to mainframe power.

Designed for operation with NAS mainframes only, NAS*NET hardware and NAS*LINK software make an AS/XL or AS/VL host appear as a DECnet node, enabling DEC users to access mainframe-processing power and data without learning new system operation techniques, a NAS spokesman said. The software supports bidirectional file transfer and enables users on either system to access data and directories on the other system remotely.

"Our strategy is to add value to

our systems to make them more attractive to DEC users than Amdahl Corp.'s and IBM's," the spokesman said. IBM's lack of DEC connectivity tools has opened the doors for such vendors as Interlink Computer Sciences, Inc. and DEC itself to produce gateways linking DECnet to IBM's Systems Network Architecture.

NAS*NET hardware consists of four boards residing in a NAS mainframe chassis. Those boards include a mainframe channel-interface controller, an Ethernet network controller, a system controller and a processor board supporting 4M bytes of random-access memory. The boards are all based on National Semiconductor's Series 32000 microprocessors.

Providing the physical connection between the 10M bit/sec Ethernet and the 3M byte/sec NAS mainframe channel, NAS*NET also converts DECnet protocols to IBM SNA 3270 protocols. It also enables up to 28 DECnet nodes to link to the mainframe simultaneously.

NAS*LINK software works in conjunction with those boards to translate data formats and application command language between

VAX systems and the NAS mainframe. For instance, the software will handle conversions between DEC's Digital Command Language commands and IBM TSO, CMS or VTAM commands.

NAS*LINK also enables the DEC user to access the NAS system via VTAM, TSO or CMS. NAS users can access DEC files from TSO applications running under MVS or CMS applications running under VM.

DEC users can also access and massage data on the NAS system without first downloading it to the VAX system. DEC users can also start tasks on the NAS system, break the connection and return later when the task is completed.

David Passmore, a consultant with Network Strategies, Inc. of Fairfax, Va., said, "I see this as a direct competitor to Interlink's DECnet-to-SNA gateway products." Interlink markets a gateway that attaches to the block- or byte-multiplex channel of an IBM mainframe.

"NAS has recognized the fact that there are a lot of people out there with DECnet and Ethernet installations, rather than SNA networks. There is an opening for this type of product that interconnects DEC VAXes and mainframes," Passmore said.

A NAS*NET and NAS*LINK installation will cost \$125,000. ■

NETWORK WORLD

An IDG Communications Publication

Box 9171, 375 Cochituate Road
Framingham, Mass. 01701-9171
617-879-0700

Editor
Bruce Hoard

Managing Editor
John Gallant

Features Editor
Steve Moore

Assistant Managing
Editor — News
John Dix

Assistant Managing
Editor — Production
Lisa Guisbond

Senior Editors
Paul Korzeniowski
Paula Musich
Pamela T. Powers
Bob Wallace

Senior Writer
Michael Fahey

Staff Writers
Josh Gonze
Mary Linehan

New Products Editor
Jim Brown

Washington, D.C. Correspondent
Karyl Scott
1273 National Press Building
529 14th Street NW
Washington, D.C. 20045

West Coast Correspondent
Mary Petrosky
501 Second Street
Suite 600
San Francisco, CA 94107

Senior Assistant Features Editor
Robert Mitchell

Assistant Features Editor
Bruce Guptill

Associate Editors
Peter Hoffmann
Beth Lazarus

Copy Editors
Joanne McQuaid
Anne Ryder
Samantha Shubert

Art Director
Dianne Barrett

Informational Graphics Designer
Susan Champeny

Assistant to the Editor
Cheryl Tynan

Contributing Editor
John J. Hunter

Publisher
Gary J. Beach
Administrative Manager
Mary Fanning

Second-class postage paid at Framingham, MA, and additional mailing offices. *Network World* (USPS 735-730) is published weekly, except for a single combined issue the last two weeks in December by CW Publishing/Inc., 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171.

To apply for a free subscription, complete and sign the qualification card in this issue or write *Network World* at the address below. No subscriptions accepted without complete identification of subscriber's name, job function, company or organization. Based on information supplied, the publisher reserves the right to reject non-qualified requests. Subscriptions: 1-617-620-7760.

Non-qualified subscribers: \$3.00 a copy; U.S. — \$95 a year; Canada, Central & South America — \$110 a year; Europe — \$165 a year, all other countries — \$245 a year (airmail service). Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin. Please include mailing label appearing on front cover of the publication.

Network World can be purchased on 35mm microfilm through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich. 48106.

Network World is distributed free of charge in the U.S. and Canada only to qualified management or professionals who specify and maintain communications equipment and systems, including voice, data and video, as well as to common carriers, consultants, systems houses and manufacturers of communications equipment.

PHOTOCOPY RIGHTS: Permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CW Publishing/Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of \$3.00 per copy of the article, plus \$.50 per page is paid directly to Copyright Clearance Center, 21 Congress Street, Salem, Mass. 01970.

Permission to photocopy does not extend to contributed articles followed by this symbol. ✚

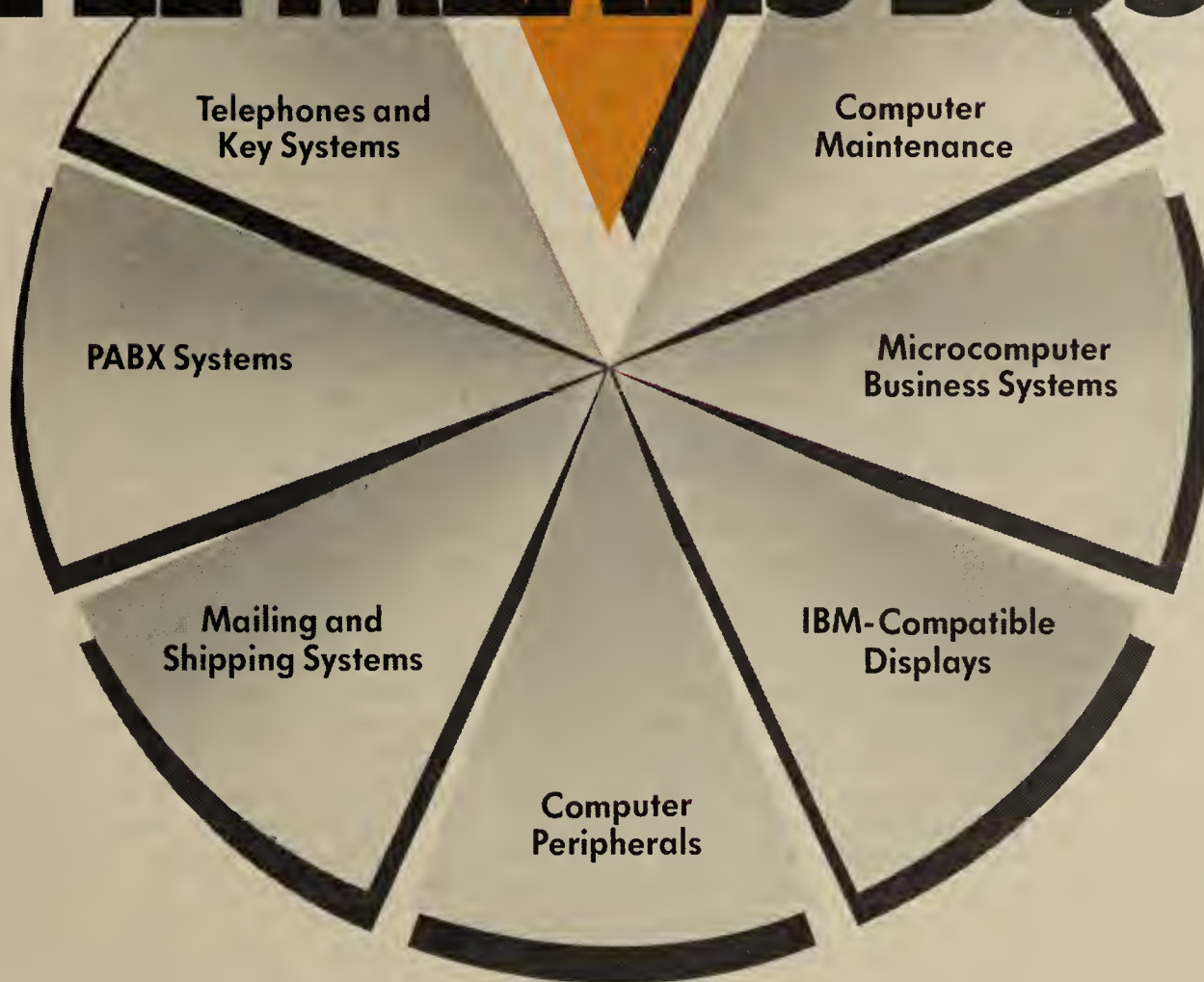
POSTMASTER: Send Change of Address to *Network World*, Box 1021, Southeastern, Pa. 19398-9979.

Copyright 1987 by CW Publishing/Inc. All rights reserved. Reproduction of material appearing in *Network World* is forbidden without written permission.



Special requests for reprints and permissions only should be addressed to Nancy M. Shannon, CW Publishing/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171.

ALCATEL MEANS BUSINESS



That's why we're called Alcatel Business Systems. Because our name reflects our focused commitment to improve the efficiency and productivity of American business.

Which, in turn, will make American businesses more profitable.

Alcatel Business Systems is a group of seven distinct companies joined by a common vision—to provide you with the best integrated communications, business information systems and services.

By themselves, these Alcatel companies are respected industry leaders in their fields, including single and multiuser business computers, computer terminals, local area network products, letter-quality printers, office publishing systems, single and multiline telephones, PABXs

and key systems for small-to-medium-size businesses, postal and shipping systems, and computer service and maintenance.

As a group, these Alcatel companies work together to create a symmetry of systems and services, offering a comprehensive range of communications and information processing solutions for your business.

And because each of these companies is an integral part of Alcatel n.v., a multinational corporation with over \$13 billion in sales, you can be sure that the Alcatel companies you work with today will be there when you need them tomorrow.

It's what we call our keystone commitment—and it's a fundamental part of the way we do business.

And we do mean business.



For more information on Alcatel and the Alcatel Business Systems companies, call 1-800-556-1234 (ext. 247) or in California 1-800-441-2345 (ext. 247); or write Alcatel Business Systems, 1623 Buckeye Drive, Milpitas, CA 95035.

CORTELCO *
Second Largest U.S.
Manufacturer of Telephones
and Key Systems

**COURIER INFORMATION
SYSTEMS**
Leading Supplier of IBM-
Compatible Display Systems

FRIDEN ALCATEL
Innovative Supplier of
Postage Meters, Mailing and
Shipping Systems

PABX SYSTEMS CORPORATION **
Supplier of Advanced
Small and Medium Size
PABX and Key Systems

QUME CORPORATION
Leading Manufacturer of
Computer Peripherals

SERVCOM
Computer Maintenance and
Support Services

XTRA BUSINESS SYSTEMS
Complete Line of High
Performance Microprocessor-
Based Computers

* Formerly Apporotus Division of ITT Telecommunications.

** Formerly ITT Business Communications Corporation and Thomson CSF Operations.

► MISCONDUCT CHARGE

GSA officials face probe by Justice

FTS awards result in scandal.

BY KARYL SCOTT
Washington, D.C. Correspondent

WASHINGTON, D.C. — The U.S. Department of Justice confirmed last week that it is investigating possible criminal misconduct by U.S. General Services Administration officials in the awarding of \$55 million worth of Federal Telecommunications System (FTS) switching contracts.

The Justice Department said it had been asked by the office of the GSA Inspector General to review FTS contracts awarded to four regional Bell holding companies and AT&T in October. The office of Inspector General is responsible for conducting internal investigations.

The department is investigating whether GSA contracting officials accepted gratuities, such as dinners and promises of future employment, from unnamed vendor parties hoping to receive favorable treatment in the contract bidding process. Justice Department involvement is an indication of possible criminal action.

The GSA Inspector Gen-

eral is conducting its own investigation to see if GSA contracting officials illegally favored AT&T's competitors in awarding electronic tandem switching service contracts.

The FTS contracts were part of a project to upgrade the switching capabilities of the federal government's existing long-distance net.

The issue of possible misconduct first arose on Oct. 26, when AT&T filed a protest with the GSA Board of Contract Appeals, alleging that certain RBHCs had received favorable treatment from GSA officials responsible for awarding the FTS service contracts.

AT&T charged that the "GSA discriminated against AT&T by applying different evaluation standards to AT&T's bid than those used to evaluate the RBHCs' bids." AT&T also alleged that certain GSA officials may have leaked proprietary information about AT&T's bids to its competitors before the final awards were made.

AT&T further charged that the possibility of criminal misconduct could raise questions about the FTS 2000 procurement, which

is currently under way, because some of the individuals who worked on the FTS switching contracts are also involved in FTS 2000. FTS 2000 is a \$4.5 billion program to replace the federal government's long-distance network with a state-of-the-art system.

Last week, GSA representatives met with AT&T officials and, for the third time in as many weeks, asked AT&T to drop its protest on the grounds that it could jeopardize the Inspector General's investigation, Herman said. AT&T refused to do so.

GSA officials late last week asked the GSA Board of Contract Appeals to reject AT&T's protest or suspend it for 75 days. The board took the matter under advisement and must decide within 10 days.

The GSA announced the FTS awards on Oct. 19. AT&T won a \$4.9 million contract to upgrade switching services for FTS locations in Los Angeles. Bell Atlantic Corp. won a \$4.5 million contract for switching services for FTS locations in Washington, D.C. and Philadelphia.

Pacific Bell won a \$326,000 contract for switching services in San Francisco; Southwestern Bell Corp. won a \$2.1 million contract for Atlanta and New Orleans; and US West Information Systems, Inc. won a \$2.4 million contract for Minneapolis and Seattle. ▀

Washington Update

BY KARYL SCOTT
Washington, D.C. Correspondent

WASHINGTON, D.C. — Two key members of the U.S. House of Representatives Commerce Committee last week called the Federal Communications Commission "price cap" alternative to traditional rate regulation "extreme" and potentially harmful to consumers.

Committee Chairman John Dingell (D-Mich.) and Telecommunications Subcommittee Chairman Edward Markey (D-Mass.) sent a strongly worded letter to FCC Chairman Dennis Patrick. The letter said committee members were not convinced by arguments made last month by Patrick in a Telecommunications Subcommittee hearing on the rate cap proposal now being considered by the FCC.

The cap would set a price ceiling on the telephone rates of AT&T and the regional Bell holding companies. The carriers would have more freedom to raise and lower rates within the cap. The current rate-of-return regulation allows AT&T and the RBHCs to earn a predetermined level of profit.

The lawmakers said the rate cap plan could "expose telephone customers to marketplace abuse." They said the regulatory alternative could subject tele-

phone customers to rates "that are higher than economic costs" and could give carriers "profits that exceed a fair return on invested capital." The rate cap would give carriers a perverse incentive to turn any cost savings into profit and cut corners at the expense of quality service.

The congressmen indicated they will not allow the plan to be enacted unless their concerns are addressed.

MFJ business restrictions probed

The U.S. Senate Communications Subcommittee last week examined the Modified Final Judgment business restrictions imposed on the regional Bell holding companies and the possibility of giving the RBHCs more leeway to participate in businesses that are currently off-limits.

While the hearings were seen primarily as a way of keeping the Communications Subcommittee up to date on recent actions taken by U.S. District Court Judge Harold Greene on the Modified Final Judgment restrictions, the RBHCs are hoping the lawmakers can prod Greene to loosen the prohibitions.

BellSouth Corp. Vice-President of Corporate Planning C. Sidney Boren said it is unlikely the Senate will enact legislation to free the RBHCs. ▀

► SHAREHOLDER VOTE

Western Union's fate awaits

BY PAM POWERS
Senior Editor

UPPER SADDLE RIVER, N.J. — Western Union Corp.'s fate may be revealed today when the company releases the results of a shareholder vote on a restructuring plan

that could snatch the loss-plagued company from the jaws of bankruptcy.

Western Union is expected to report the outcome of shareholder votes placed during the company's thrice-postponed annual meeting, which was finally held last Friday. If less

than 80% of the shareholders vote in favor of the plan, Western Union will be forced to file for protection from creditors under Chapter 11 of the Federal Bankruptcy Code.

A bankrupt Western Union could spell trouble for users: The company may sell off some parts of its business to generate cash and may even terminate some long-term contracts.

Western Union's proposed restructuring plan calls for private investor Bennett S. LeBow to buy the company and merge it with ITT Corp.'s international telex operations. If the plan is approved, the ailing telegraph company would still have to raise \$500 million to pay for ITT World Communications, Inc. and eliminate some debt. It also has to convince its debtholders to exchange their securities for shares

in the newly restructured company by Tuesday. These elements must be completed in order for the restructuring to go forward.

Western Union officials would not comment on the progress of either the debt exchange or fund-raising efforts. But the company has twice postponed the deadline for debt exchange, which suggests that debtholders have been reluctant to participate.

Further fueling speculation that Western Union may file for Chapter 11 is the company's decision to default on several interest payments that are due to its lender banks. Those banks recently refused to extend their loan agreements to Western Union.

But while it may be preparing for the worst, Western Union is doing its utmost to push through the restructuring proposed by LeBow late last year. That's because it has reason to fear Chapter 11.

Under bankruptcy proceedings, a debtor company

presents a plan of repayment to its creditors and, once the plan is approved by the court and creditors, can conduct business as usual — as long as payments are made on time. However, Robert Resnick, a principal with the Boston-based law firm Cullen and Resnick, cautioned that "bankruptcy is an adversarial process, with the creditors closely monitoring the debtor's activities."

Resnick said that, for Western Union to meet a repayment plan, the company would very likely have to sell off some portions of its business to raise capital to pay off creditors. That puts users of Western Union services, particularly less successful services, in a precarious position.

And users holding long-term contracts with Western Union could suddenly be left holding the bag. Under bankruptcy law, Resnick said, the debtor company has the right to reject all executory contracts or all contracts that extend into the future. ▀

APL

THE DIRECT ALTERNATIVE

Private Lines
between 50 cities at
an APL price.

- DSO
- VF
- TI

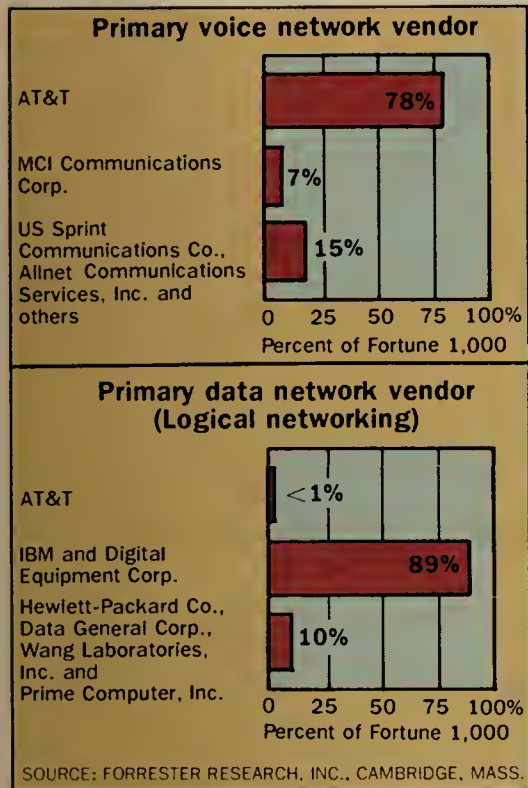
American Private Line Services, Inc.
140 Gould Street, Needham, MA 02194
(617) 455-9000 or 1-800-624-9203

INDUSTRY UPDATE

Intecom's service rating improves

Long dogged by a reputation for poor customer service, Intecom, Inc. announced that its ratings for user satisfaction improved by 30% in recent voting by the Integrated Business Exchange User Association Group.

AT&T's rank as Fortune 1,000 supplier 1987



► NETWORK SURVEY

ATM net use increases; debit cards start to flower

BY JIM BROWN
New Products Editor

CHICAGO — Although automated teller machine transaction volume grew faster than expected in 1987, ATM network operators are still waiting for a heralded influx of debit card transactions, according to a recently released report.

The annual ATM network survey conducted by the industry newsletter "Bank Network News" found the top ATM networks were prepared to handle 1987's 11% increase in ATM volume — despite a sluggish 1986.

Network operators are utilizing excess capacity built into their net-

works to support point-of-sale transactions that are only now beginning to materialize, according to John Love, publisher of "Bank Network News" and companion newsletter "POS News." Love added that, increasingly, ATM net operators are charging consumers transaction fees, adding a new source of revenue.

"Bank Network News" surveyed 110 of the nation's approximately 125 regional ATM networks, asking for such information as the number of ATM and POS transactions processed in September and the number of ATMs and POS card-reader terminals deployed in the networks. The survey compared

those figures with results from September 1986.

POS transaction volume grew by 64%, from 3.2 million transactions in September 1986 to 5 million in September 1987, Love said. The number of POS card-reader terminals deployed in retail outlets grew 37% from 25,148 in 1986 to 39,969 in 1987.

Despite the growth in POS transaction volume and terminals, Love said some merchants are still unwilling to accept debit cards as a payment method due to the number of different networks to which they would have to link and the number of different cards they

See page 10

BRIEFS

Atlantic Research Corp. agreed last week to be acquired for \$316 million by Sequa Corp., a company with principal holdings in aerospace and military electronics. The acceptance of Sequa's proposal marks for Atlantic Research the end of a series of unsolicited bids for the company. Atlantic Research manufactures defense equipment and data communications test equipment.

GTE Data Services, Inc. recently was awarded a \$2 million expansion on a contract with current customer TCOM Systems, Inc., under which GTE will manage the company's nationwide network of IBM 9370 computers remotely. TCOM Systems, which markets a high-speed mail service to high-volume businesses, uses the network to transmit documents and mailing lists electronically for delivery.

Northern Telecom Ltd. purchased for \$2 million about 30% of the point-of-sale systems manufacturer International Verifact, Inc. (IVI). Northern Telecom's stake in IVI, subject to shareholder and regulatory approval, also involves a joint agreement whereby the two companies will pursue sales opportunities in the POS, security and smart card industries. Smart cards are cards with memory and intelligence that perform a variety of functions. IVI claims to be the largest direct-debit terminal manufacturer in the U.S.

See Briefs page 10

► INDUSTRY/ACADEMIA ALLIANCE

Nynex to support MIT net research

BY JOSH GONZE
Staff Writer

CAMBRIDGE, Mass. — Nynex Corp. agreed recently to provide the Massachusetts Institute of Technology with funding and staff support for research in four computer- and communications-related areas, including advanced design for fiber-optic networks.

Under terms of the contract, Nynex will provide the university with a research budget each year. There is no limit on the length of the arrangement, according to Nynex officials. The amount of funding will be determined annually, after progress has been reviewed and plans for the upcoming year have been finalized.

MIT expects a "multimillion-dollar level of support over a number of years," said Eugene Mallove, chief science writer in the MIT news office. No initial amount of funding was disclosed.

In addition, Nynex will send engineers to MIT laboratories here to participate in collaborative research. The knowledge the regional Bell holding company obtains "will ultimately reflect itself in the kind of networks we build, the kinds of capabilities our networks have and, consequently, the specific services our customers will be buying from us four or five years down the

road," said Casimir Skrzypczak, vice-president of the Science and Technology Department at Nynex.

The goal of the MIT/Nynex research on fiber-optic net design is to find ways to use fiber's high bandwidth to cut down on costly features common to current networks, such as large switches. Most current network architectures assume communications media with limited bandwidth, according to Robert Kennedy, an electrical engineering professor at MIT who is involved with the project.

Limited bandwidth has led to use of expensive bandwidth-conservation equipment such as circuit and packet switches. The inherently high bandwidth of fiber fundamentally changes the rules of the network design, Kennedy said.

"One of the principal goals is to find how to design communications networks when your goal is not to conserve bandwidth. The lack of bandwidth pressure creates a new situation. There are new questions that arise. First and foremost is why you should be doing the things that you have been doing in the past, like switching, be it packet or circuit," Kennedy said.

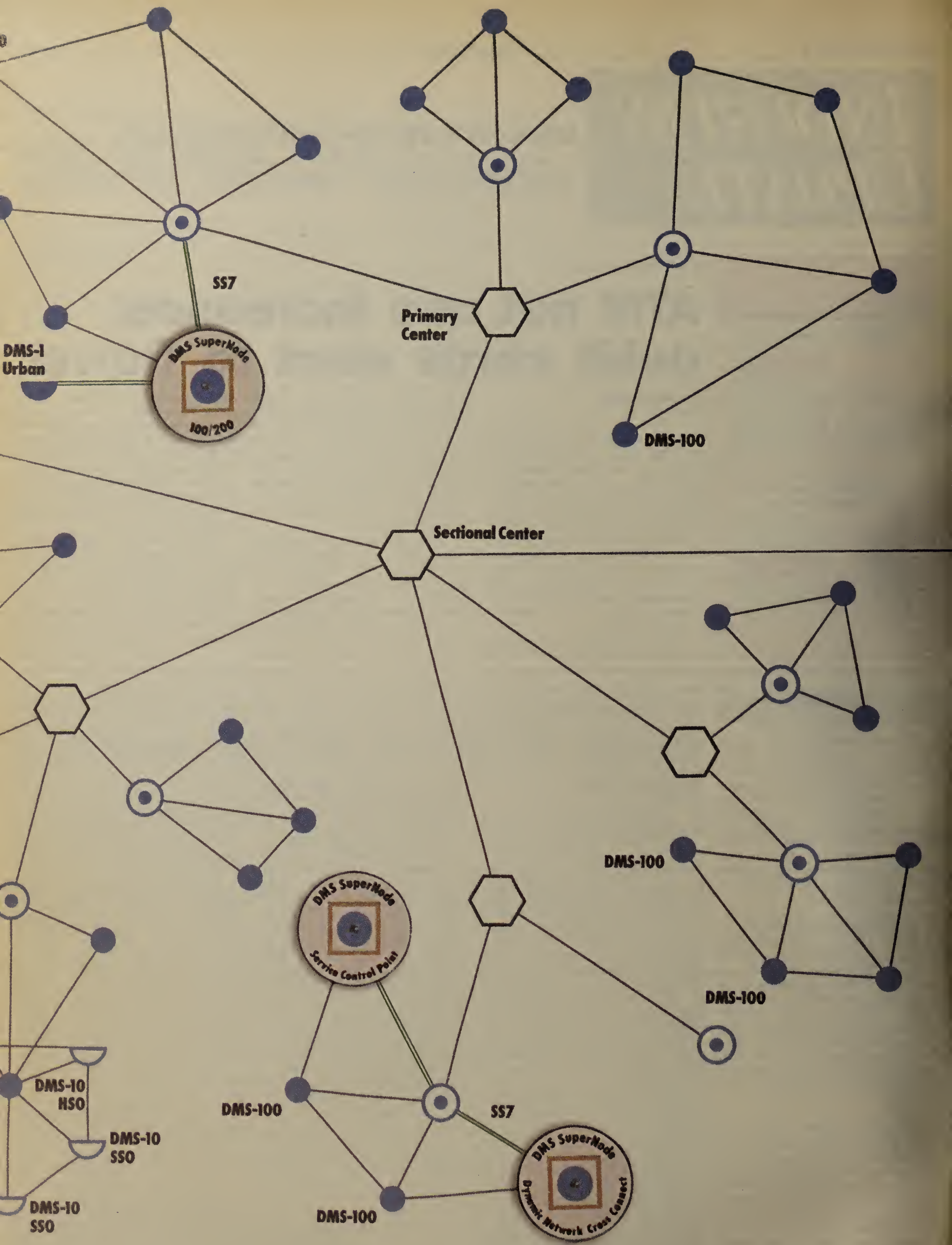
Officials said the research could eventually help both private network users and common

carriers construct far more efficient fiber-optic systems. The research could "increase, by several orders of magnitude, the capacity and capabilities of the fiber systems being deployed," Nynex's Skrzypczak said.

Separately, the contract calls for Nynex to sponsor a series of media-presentation experiments studying advanced typographics, computer-generated color copy and multimedia terminals. The project will come under the aegis of MIT's Media Laboratory.

Other projects described in the contract involve using artificial intelligence technology to support software development and to explore "new ways of improving the efficiency of producing quality software," according to MIT. Increasing productivity in software development is a major objective in the telecommunications and computer industries, an MIT spokesman said.

MIT also recently reaffirmed an agreement with Bell Communications Research, Inc. for joint research and funding in support of two of the same projects Nynex will fund. BELLCORE has long supported communications research at MIT and other large universities. It expects to gain data for network planning, said BELLCORE's Eric Nussbaum, assistant vice-president of network system services research. □





NEW ENERGY FOR THE NETWORK: DMS SuperNode

The network is pulsating with new power, with new harmony—with a new future.

Northern Telecom's DMS SuperNode* system releases the untapped potential of the network with innovative, high performance enhancements

Any DMS-100/200 system can be upgraded to a DMS SuperNode system that combines DMS* circuit and packet switching functions, signal transfer points, service control points, cross connects and other applications processors.

Unmatched processing capacity gives you power to meet the demand for advanced network services such as Meridian Digital Centrex, 800 Services, private virtual networking and ISDN services.

Seamless integration brings previously separate network resources into harmony, concentrating their power in highly efficient nodes.

And broad flexibility protects your network investment by smoothing the transition to Open Network Architecture and Intelligent Network II

DMS SuperNode reaffirms Northern Telecom's commitment to OPEN World*—to interwork with other manufacturers' equipment.

A determined commitment to the Intelligent Universe*, where sharing information, anywhere, anytime and in any form, will be as easy as using a phone today.

nt northern
telecom

NETWORKING

Briefs from page 7

Ball Corp., a \$1 billion manufacturing concern, contracted with Telenet Communications Corp. to supply EDI services to Ball for electronic transmission of purchase orders and invoices to suppliers and customers. The EDI contract is one of Telenet's first, following the company's decision to support that service through agreements with large EDI providers.

The value of the deal was not disclosed.

Contel Federal Systems Sector's Applied Systems Division recently won a \$10.2 million add-on to an existing contract with the U.S. Air Force. Under the contract, Contel will provide the Air Force with direct wideband connections between the Air Force's Consolidated Space Operations Center in Colorado, the Satellite Test Center in California and the remote tracking stations that comprise the Air Force network. The contract is a boon for Contel's Federal Systems Sector, which recently reported a poor earnings quarter.

Digital Equipment Corp. and **Siemens Medical Systems, Inc.** announced a joint project under which the two companies will develop a Picture Archiving and Communications system for the health care industry that will permit the integration of medical images and patient information into departmental and informationwide computer networks.

The companies cited Siemens' expertise in medical electronics imaging and DEC's expertise in computer networking as instrumental in bringing about a system through which personnel can retrieve patient information at any console.

ITT Corp. announced its intent to purchase, for \$18.5 million, the long-distance services concern **American Network, Inc.** The acquisition of American Network, which reportedly has 70,000 customers, would be a surprise move on ITT's part, as the company has recently shed most of its communications divisions.

BBN Communications Corp. was awarded a contract by New York-based Chemical Bank for the installation of an international private packet-switching network that will connect the bank's IBM S/38 computers.

For the first six months or more, BBN will operate the network from its own Network Operations Center.

SunGard Recovery Services, a division of **SunGard Data Systems, Inc.**, last week said it is doubling the size of its Chicago recovery center and increasing the size of its Philadelphia center, its two largest centers for disaster recovery of computer and communications systems. SunGard's strategy is to provide a number of regional disaster recovery centers that will be interconnected by a large network. ☐

ATM network use increases

continued from page 7

would have to accept. But, as more regional ATM networks agree to provide links between area financial institutions, merchants will be able to accept larger numbers of ATM cards by linking to only one regional network, he added.

"POS, while it has great potential, has been disappointing in the last five years. But POS will take off soon and exceed ATM volume by the early 1990s," Love said.

POS debit cards let customers have the purchase price deducted from their bank accounts at the time of the sale. A customer passes the debit card through a card-reader terminal at the merchant loca-

tion and enters a personal identification number (PIN) on a keypad attached to the terminal.

Account information is gleaned from the magnetic strip on the card and sent with the PIN via a leased line to the merchant's bank, which, in turn, can be linked to a regional ATM network. The regional ATM net links to the financial institution with the customer's bank account and gives transaction authorization or denial to the merchant.

Love said most of the top 30 ATM networks have already upgraded their networks, including installation of new software, to support POS transactions. Some

ATM networks have even replaced Tandem Computers, Inc.'s NonStop transaction-processing minicomputers with more powerful IBM mainframes in anticipation of increased POS volume.

The upgraded networks will support rapid response times required to minimize checkout lines at merchant locations. They will also support a broader range of transactions than ATMs, including the ability to credit a customer account for items returned to a merchant and increased security such as encryption of the customer's PIN, account number and transaction data sent via telephone lines.

Love said the growth of POS will be aided by the recent development of a set of POS network stan-

HOW WE WORK IN THE LINE OF FIRE.



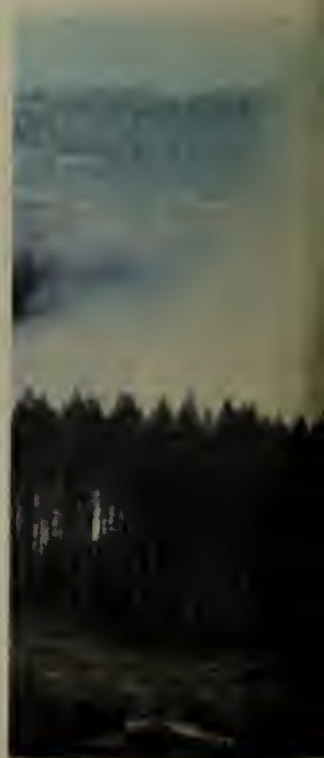
During the late summer of 1987, the entire state of California seemed ablaze. Fires raged uncontrollably, scorching hundreds of thousands of acres of valuable forest lands.

With life and limb at stake in the Klamath National Forest, the firefighters needed more than just conventional methods to deal with the situation. They needed a quick-start system for emergency communications.

Which is why they chose Digital Microwave's portable 23GHz radio system.

Equipment tailor-made for emergency situations. Enabling firefighters to put the system into place without losing precious time or acres.

When smoke obscured line of sight, the radios and repeaters were aligned by map and compass. This



dards to support Entree, a national debit card program marketed jointly by Visa, U.S.A., Inc. and MasterCard International, Inc. Those standards are based on POS guidelines developed by the American Bankers Association.

The Interlink Network, owned by a group of 11 financial institutions in California and Arizona, now processes the most POS transactions, with 2.9 million transactions in September, compared with 1.8 million in September 1986. Interlink cards are accepted at more than 325 Lucky Stores, Inc. supermarkets in California.

On the ATM side, the number of transactions processed in September 1987 hit 335 million, up from the 301 million processed in Sep-

tember 1986. That growth of 11% is larger than the mere 2½% growth in transactions recorded in 1986. The survey found there were 4,000 more ATMs installed since September 1986, bringing the number of ATMs deployed across the country to 68,000.

Love said the increase in ATM volumes was partially due to increased advertising and marketing efforts on the part of the ATM networks. Also contributing to the increased traffic was the fact that the few financial institutions that had already started charging transaction fees decreased those fees from 75 cents to \$1 per transaction to between 25 cents and 50 cents per transaction.

Networks charge member finan-

cial institutions a fee for processing a transaction. Some financial institutions have begun passing that fee along to customers who use their cards at ATMs owned by competing financial institutions belonging to the same network.

Customers felt the 75 cents-to-\$1 fee was too high and curtailed some of their transaction activity, Love said. "But that 25 cents to 50 cents seems to be a fee consumers will pay for the convenience of using another bank's ATM."

The 2-year-old Fort Lee, N.J.-based New York Cash Exchange (NYCE) network is the leading network in the country in terms of ATM transaction volume, the survey shows. NYCE processed some 28.5 million transactions in Sep-

tember, up from 15 million in September 1986. The Pulse network of Texas, a onetime leader in volume, slipped to fourth, with 17.8 million transactions, up slightly from 16.3 million in September 1986.

The largest transaction-volume increase, percentage-wise, was recorded by the Connecticut-based Yankee 24 network, which went from 3.9 million transactions in September 1986 to 10 million in September 1987, a 159% increase. Most of that increase in volume came when the Boston-based Bank of Boston Corp., Bank of New England, N.A., Shawmut Corp. and State Street Bank and Trust Co. joined the network, along with Providence, R.I.-based Fleet National Bank. □



system was then tied directly into the PBX at the National Forest Service Office in Fort Jones, California.

From there, the system was connected to the Siskiyou Telephone Company's Central Office. Creating hot lines that helped the firefighters keep ahead of shifting winds and the traveling fire.

While all our success stories aren't quite so dramatic, working in the line of fire is nothing new for Digital Microwave. Fortune 500

corporations, RBOCs, and government agencies use our technology on the job every day.

As a result, we have everything you need for a complete short haul system. Besides 23GHz narrow and wide band, we offer 13GHz and 18GHz digital microwave radios that operate up to 45Mb/s; and fiber optic systems that perform from 1.544 Mb/s to 45 Mb/s.

All are available in U.S. and CEPT digital formats and line rates.

So call (800) 255-4DMC and see what we can do for your vital lines of communication.

After all, our short haul system is built to go through fire for you.

Digital Microwave

HOW TO MAKE ENDS MEET

170 Rose Orchard Way, San Jose, CA 95134
(408) 943-0777 Telex: 759597



► LEGAL ACTION

Micom hit with trade secret suit

BY PAM POWERS
Senior Editor

SIMI VALLEY, Calif. — Two companies filed suit recently against Micom Systems, Inc. and two of its engineers, claiming that the engineers used trade secrets to develop a voice-digitizing product for Micom Systems.

Separately, Micom Systems said it completed its acquisition of Spectrum Digital Corp., a T-1 multiplexer manufacturer, for \$19.4 million.

Republic Telcom Systems Corp. and Centigram Corp. have filed a civil action in the U.S. District Court, Northern District of California, charging that two of its former employees, now engineers for Micom Systems, used technologies developed by Centigram and Republic Telcom in the development of the Micom System Oneliner voice-digitizing product.

Oneliner uses a voice-packetizing technique derived from algorithms that were developed by Centigram, the two prosecuting companies said.


Centigram and Republic Telcom seek damages for breach of contract, copyright infringement and misappropriation of trade secrets, among other things.

Dianne Ford, a Micom Systems vice-president, responded to the lawsuit, saying, "We believe there is no foundation to the allegations and will defend ourselves."

Micom Systems' acquisition of Spectrum Digital follows an earlier agreement under which Micom Systems resold Spectrum Digital's integrated voice and data switching multiplexer.

Spectrum Digital now will become a wholly owned subsidiary of Micom Systems, providing it with a much-needed access to the high-end multiplexer market. Analysts have said that the company has been slow to enter that high-growth market. □

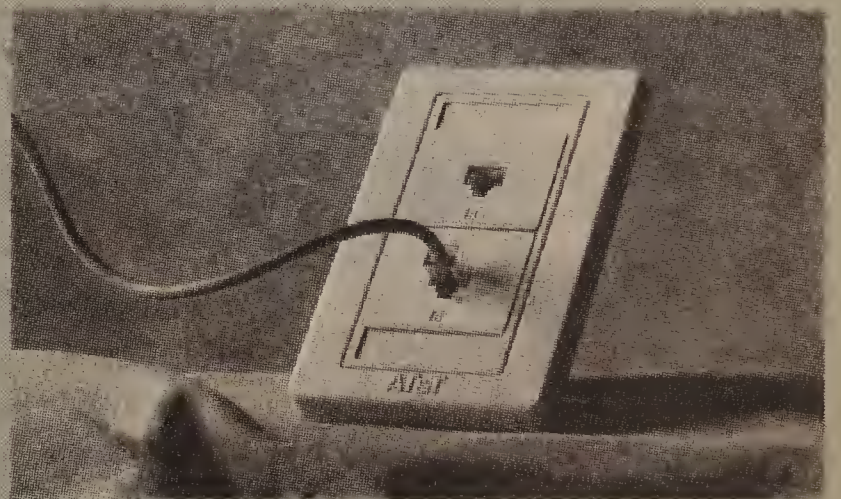




“We’re building our system into the walls, not building walls into our system.

We’d wasted enough money and floor space in the past, messing with separate voice and data schemes. Reconfiguration was an ongoing nightmare. Ever try to cross-connect using Type 2 cable? Believe me. Since we were starting from the ground up, we wanted a wiring plan that was once-and-for-all. One that was flexible, designed to handle upgrades and changes. And one that wasn’t going to come back and hang us with a coaxial noose. We’ve got enough competitors who’d like to do that.

AT&T comes through.”



The AT&T Premises Distribution System

AT&T believes you shouldn’t have to pay for multiple wiring schemes to support multiple products and services.

Which is why we offer PDS. A total, cost-effective, modular wiring plan able to integrate voice, data and image devices. A comprehensive plan suitable to almost any new or existing building. Whether it’s a one-story office or a multi-tenant complex.

Using universal wall jacks, optical fiber and unshielded twisted-pair copper, the system (and its sub-systems) is designed to support an unlimited variety of configurations. Now and into the future.

To learn more, contact your AT&T Account Executive. Or call 1 800 247-1212.

From equipment to networking, from computers to communications, AT&T is the right choice.

© 1987 AT&T



AT&T

The right choice.

Amdahl introduces a prince of a communications processor.



Our new 4725 builds on the strengths of its 4705 predecessors — installed around the world — to give you a uniquely cost-effective way to boost your network's performance.

The 4725 runs 3725 ACF/NCP software, and delivers a throughput capability that's significantly higher than its only rival's.

So you can do what you tell us you need to do: run more lines at higher speeds.

Reconfiguring's a snap.

You can add capability quickly — often without having to order, and wait for, parts. We understand that your traffic can't wait.

It's compatible.

The 4725 works with many other vendors' equipment, so you can "mix and match" and protect previous investments. We also understand your economic realities.

It's supported by people who know your business.

Experience is the best teacher, and we've learned a lot in the eight years we've invested in developing communications processors.

We understand your needs and concerns, and we know how to anticipate and respond to them. We can make things easier for you.

More productivity for your money.

That's our new 4725's ultimate value to you, and no other communications processor can match it. Call your local Amdahl representative for details.

Amdahl Corporation
1250 East Arques Avenue
Sunnyvale, CA 94088-3470

amdahl[®]
The VALUE Choice

TELECOM TRENDS

“ISDN is a concept for the evolution of a modern information network from existing networks. ISDN is not a static, short-term product. And network evolution is not a matter that is completed between breakfast and lunch.

Theodore Imer
Director

The Consultative Committee on International
Telephony and Telegraphy

BOB WALLACE

Users enlist cable experts

An increase in user awareness of the need to evaluate the condition of inside building wire has fueled the expansion of the independent cable contractors' community.

Users representing large corporations, academic institutions as well as state and local government organizations have chosen to enlist the aid of these cablers before upgrading existing systems or replacing telecommunications equipment such as private branch exchanges.

One such user, Anne Berger, telecommunications project manager for Foxboro Co., adopted a forward-thinking approach to tackling what many users consider an entangling situation.

Although many users rely on their PBX vendors to supply the cabling systems that will support their switches, Berger chose to send requests for information both to PBX vendors and companies that specialize in the design and installation of cabling systems.

She explained that many switch mak-

“Our cable plant was probably installed when God was a kid.”

ers, such as AT&T, already subcontract the cabling portion of network contracts to such cabling specialists. “It is our opinion that dealing directly with a firm that specializes in cable installation may provide substantial cost savings,” she said.

Berger said she has received bids from switch makers and from three independent cabling firms, among them Information Transport Systems, Inc., a Needham, Mass.-based firm that evaluates cable systems and designs and implements wiring systems.

Before embarking on what promises to become a time-consuming, resource-intensive networking project, Berger and her staff reviewed the state of the company's inside wire. “Our cable plant, especially the inside wire we have at our headquarters building, was probably installed when God was a kid,” she said.

The telecommunications project manager said much of the company's cable plant is in poor condition and that it is impossible to determine where other runs of cable originate and terminate. This type of cabling dilemma has been encountered by many other users.

Berger explained that although inside wire at several of the company's Massachusetts locations will probably be replaced, the current cable plant could support new switches slated for installation at these locations. ■

VIRTUAL PRIVATE NETWORKS

Foxboro SDN to shave costs \$150,000 a year

SDN network ties 40 offices, cuts credit call expenses.

BY BOB WALLACE

Senior Editor

FOXBORO, Mass. — In a move expected to save the company \$150,000 a year, Foxboro Co. recently cut over a nationwide virtual private network linking 40 branch offices to its corporate headquarters here.

The most significant aspect of the voice-based AT&T Software-Defined Network (SDN), which replaced an intricate web of WATS lines, is a uniform, seven-digit dialing plan for all network sites.

Plan eliminates credit calls

That plan eliminates the need for between \$35,000 and \$40,000 per month in costly credit card calls. “These callers were typically field support and salespeople that called from our customers' sites to Foxboro for information,” explained Anne Berger, telecommunications project manager for Foxboro.

Berger said use of SDN's remote access feature enables these Foxboro employees to dial one 800 number, enter an authorization code and dial any Foxboro SDN location. Foxboro is a manufacturer of factory floor automation systems.

“When we were looking at the different vendors' virtual network services, [AT&T's] SDN was the only service that had this feature,”

Virtual network service user profile

Company:	The Foxboro Co.
Location:	Foxboro, Mass.
Line of business:	Manufactures factory automation and control systems
Voice networks used:	AT&T's Software-Defined Network (SDN), serving 40 sites outside Massachusetts, and an AT&T Electronic Tandem Network serving most sites in Massachusetts
Projected savings from use of SDN:	\$150,000 annually
SDN features used:	Seven-digit dialing plan and remote network access for former credit card callers
Pre-RFP product evaluation strategy:	Regularly issues requests for information to a large number of vendors

SOURCE: THE FOXBORO CO., FOXBORO MASS.

Berger said.

Although Foxboro employees could not begin using this newfound capability until Oct. 16, she said, the company expected to realize savings of \$10,000 from use of the SDN feature in October alone.

Before going with AT&T, the company also reviewed MCI Communications Corp.'s Vnet virtual network service and US Sprint Commu-

See page 16

MESSAGE TOLL SERVICES

Sprint to cut MTS rates 10%

Firm's Billing Solution combines charges for services.

BY JOSH GONZE

Staff Writer

WASHINGTON, D.C. — US Sprint Communications Co. recently filed a 10% rate cut for Message Toll Services (MTS) purchased under The Billing Solution, a billing arrangement that combines charges for several of the company's services.

The discount applies to daytime, interstate MTS only and does not kick in until services purchased each month under The Billing Solution total \$1,000. US Sprint spokesman Syd Courson said the discount is “in lieu of the volume discounts that would normally apply to a large-volume user.” The Billing Solution enables customers to combine in one bill charges for MTS, WATS and US Sprint's FONcard telephone calling card.

The new tariff, filed with the Federal Communications Commission, comes on the heels of US Sprint's internal reorganization. That effort replaced the company's regional marketing structure with marketing units designed to serve different types of users. It also follows recent AT&T proposals to slash rates for switched long-distance services.

“They're matching their organizational changes with tariff changes,” said Doane Perry, senior telecommunications analyst at International Data Corp., a Framingham, Mass.-based market research firm. “They are trying to reach larger customers. Any combination of services where there is flexibility — different types of long-distance rates — is designed to appeal to the large customer.”

The move is also meant as a promotion for The Billing Solution, said Page Montgomery, vice-president at Economics and Technology, Inc., a Boston-based tariff consulting firm. “It's a smart move for Sprint and probably something that a lot of customers might want to look at.

“In Sprint's case, it's a function of three things: the spare capacity they've created in their fiber-optic network, the fact that they have not picked up as many new customers in the last three years as they thought they would and the fact that they are the third entrant in the long-distance calling card market,” he said.

US Sprint's The Billing Solution is similar to AT&T's Pro America packages, according to Robert Ellis, president of

See page 16

Sprint to cut MTS rates 10%

continued from page 15

Rockville, Md.-based The Aries Group, Inc. Ellis pointed out that under the AT&T proposal, Pro America rates will decrease, though only by about 5%.

US Sprint's Courson denied that the rate cuts are a reaction to AT&T's proposals and declined to comment on the strategy behind the move.

Both Pro America and The Billing Solution are aimed at small to medium-sized businesses that want a single carrier for MTS, WATS and calling card services, according to Montgomery.

"It makes sense for Sprint's marketing in that segment to pack-

age the FONcard with this service," he said.

The analysts agreed that US Sprint must remain competitive on

because the margins on long-distance are very narrow," Ellis said.

All five types of US Sprint's WATS services are included in The Billing Solution.

There is no service charge for users purchasing more than \$1,000

The analysts agreed that US Sprint must remain competitive on rates to survive but cannot afford an across-the-board rate cut. "No carrier can afford to be 10% cheaper than any of the others ones because the margins on long-distance are very narrow," said Robert Ellis, president of the Aries Group, Inc.

rates to survive but cannot afford an across-the-board rate cut.

"No carrier can afford to be 10% cheaper than any of the other ones

per month of services under the plan. However, subscribers with monthly bills under \$1,000 must pay a \$50 per month charge. □

Foxboro SDN to shave \$150,000

continued from page 15

communications Co.'s Virtual Private Network offering.

Although pleased with SDN's performance, Berger has joined a long list of SDN users who have experienced billing problems with the virtual private network service.

Other users have said the bills often arrive late, are incomplete and contain errors that cannot be quickly resolved. Berger said Foxboro's first SDN bill was incomplete.

Breaking from tradition

Berger and her communications staff broke from the traditional method of determining which locations should be placed on the SDN. Other virtual private net service subscribers hook only sites that can be easily cost-justified to the virtual private network.

Foxboro opted instead to put all 40 sites located outside Massachusetts on the SDN without requiring sites to meet any traffic volume or cost-of-connection criteria.

Foxboro opted to put all 40 sites located outside Massachusetts on the SDN without requiring sites to meet any cost-of-connection criteria. "Our Augusta, Maine, office doesn't generate much traffic and is far from the nearest [SDN service] point of presence," Berger explained. "If we attempted to cost-justify each location, sites like the Augusta facility would not be on the net," she said.

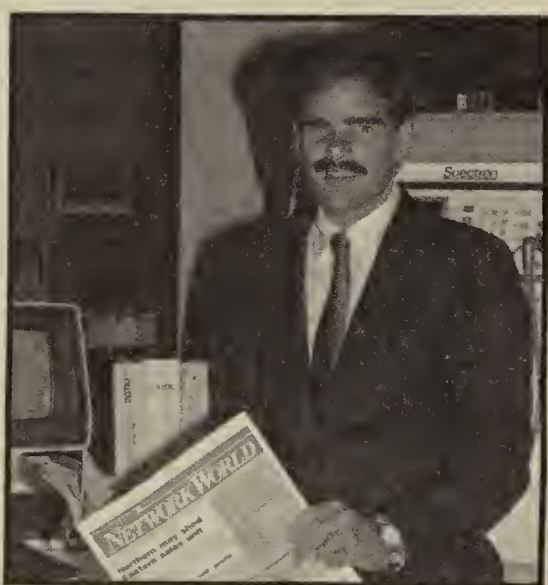
"Our Augusta, Maine, office doesn't generate much traffic and is far from the nearest [SDN service] point of presence," Berger explained. "If we attempted to cost-justify each location for the SDN, sites like the Augusta facility would not be on the network," she said. "But as part of the larger project, it made a great deal of sense to put sites like Augusta on the SDN."

ETN also in use

Foxboro now operates the SDN in addition to an AT&T Electronic Tandem Network (ETN) within the state's 617 local access and transport areas. One of Foxboro's two local facilities, its Neponset headquarters building, serves as the ETN switching node. The company's second Foxboro site, its Bristol Park facility, is connected to the ETN hub with private lines.

The company's Bristol Park and East Bridgewater sites, each using an AT&T Dimension 2000 private branch exchange, and the Plymouth facility, equipped with Dimension 600, are served by the ETN.

Foxboro would not estimate the value of the virtual private networking deal with AT&T. □



"... *Network World* clearly stands head and shoulders above the competition. One big reason is its networking focus."

Dick Hichens is Senior Technical Network Analyst for ALLTEL Corporation of Hudson, Ohio. The thirteenth largest telephone utility in the United States, ALLTEL provides cellular phones, wide-area paging services, fiber optic-based phone equipment and more to customers in 19 states. Dick is involved in purchasing ALLTEL's network communications equipment.

He must make informed decisions, based on the latest and most accurate information available. That's why he relies on *Network World*.

"I initially subscribed to *Network World* because I needed to know what's going on in the communications community, both voice and data.

"*Network World* has lived up to my expectations, period. It's the leading networking publication and I read every issue cover to cover.

"And it's a big part of my decision-making process. It works for me in two ways: articles give me detailed information on products and technologies, and advertisements provide a road map to vendors.

"I read other communications publications, but *Network World* clearly stands head and shoulders above the competition. One big reason is its networking focus. And I have many colleagues who'll tell you the same thing."

Every week, more than 65,000 purchase-involved subscribers like Dick Hichens look to *Network World* for information that can help them — and their companies — stay ahead. If you market communications/networking products and services, there's no better place to reach a powerful audience of buying decision makers. Call your local *Network World* sales office and reserve space for your ad today.

NETWORK WORLD

The Weekly for Leading Users of Communications Products & Services
375 Cochituate Road, Box 9171, Framingham, MA 01701-9171

BOSTON (617) 879-0700/NEW YORK (201) 967-1350/NEW JERSEY/PENNSYLVANIA (201) 967-1350/
WASHINGTON D.C. (301) 721-4763/ATLANTA (404) 394-7509/CHICAGO (312) 827-4433/
SAN FRANCISCO (415) 328-4618/LOS ANGELES (714) 250-3006

An IDG Communications Publication

DATA DELIVERY/ NET MANAGEMENT

► VOICE/DATA INTEGRATION

Florida state net upgrade hindered by lack of tools

BY PAUL KORZENIOWSKI
Senior Editor

TALLAHASSEE, Fla. — After deciding to merge its voice and data networks, the state of Florida discovered a dearth of equipment capable of supporting its networking needs and a lack of tools for managing the integrated network.

"Despite all the talk about voice and data integration, there are significant gaps between what is currently available and what custom-

ers require," said Glenn Mayne, director of the state's Division of Communications.

Mayne's group manages the private voice and data networks used by all state agencies and 70% of Florida's local governments, including county, city and school districts. A private voice network supports 90,000 pieces of telephone equipment and enables employees to call one another without accessing public carrier facilities.

A data network lets terminal us-

ers access computers housed around the state. Mayne said 60% of the terminal users work with IBM equipment, 25% use systems from Unisys Corp. and the remaining 15% work with processors from a number of different vendors. Mayne's group is responsible for tracking network usage and for billing various departments.

The network overhaul stemmed from the state's need to migrate from Telpak, an AT&T bulk calling service that enables customers to

"Even though the majority of business communications is still done on the phone, vendors are concentrating on data network management. Customers need help sorting out voice issues, such as planning for voice network growth and change. Every customer evaluating a data network management system is also a suitable candidate for a voice system."

Michael Dortch
Senior analyst
The Yankee Group
San Francisco

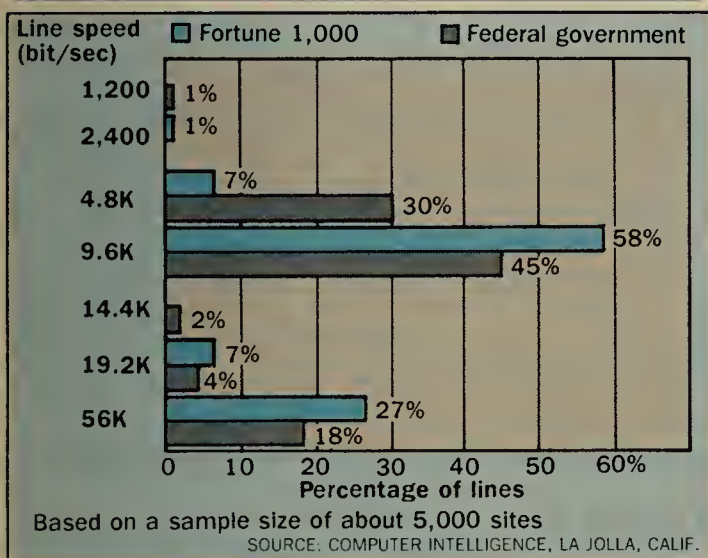
purchase volume private-line services at a substantial discount. The tariff is slowly being phased out and will not be available in Florida in 1990.

In 1985, the state decided to revamp its networks and solicited bids from a number of vendors ("Study: Florida net future dim," NW, July 28, 1986). "We looked at every possible private network or public network alternative," Mayne explained.

After examining the alternatives, the state decided to install an integrated voice and data backbone network. Rather than overhaul the two networks simultaneously, the state decided to revamp its voice network first. That net supports a wide range of equipment, such as key systems

See page 18

Digital line use: Fortune 1,000 and federal government



► SUPERCOMPUTING

NSFNET boost under way

BY MARY LINEHAN
Staff Writer

ANN ARBOR, Mich. — Officials overseeing an upgrade of the National Science Foundation's (NSF) supercomputer network recently discussed details of the network overhaul, expected to be completed by mid-1988.

Merit, Inc. was awarded \$14 million by the NSF late last month to direct the network upgrade and supervise operation of NSFNET for the next five years. Merit is a consortium of eight Michigan state universities and colleges that operates a computer network linking the schools; the network is linked to NSFNET. Merit said recently it will work with IBM, MCI Communications Corp. and the state of Michigan to upgrade the network.

NFSNET is a wide-area network linking six supercomputer facilities throughout the nation. Regional, or mid-level, networks tied to

See page 18

DATA DIALOGUE PAUL KORZENIOWSKI

Being all things to all users

Unisys Corp.'s recent acquisition of Timeplex, Inc. foreshadows a fundamental shift in the data communications market. During 1988, customers may find the faces of their suppliers changing dramatically.

Most data communications vendors started off supplying a well-designed niche product, such as a statistical multiplexer, matrix switch or diagnostic modem. But, as customers struggle to piece together a collage of data communications products into a coherent network, they are demanding that suppliers broaden their product lines and become providers of many types of equipment.

Consequently, T-1 multiplexer manufacturers are moving into the network management and X.25 markets. Modem manufacturers are adding matrix switches and local-area networks to their lines. Network management vendors are augmenting their wares with T-1 multiplexers.

Vendors are trying to leverage the strength of their niche products to build these broad lines. For example, T-1 multiplexer manufacturers depict T-1 equipment as the most important piece of the customer's communications network. Once a corporation has selected a T-1 multiplexer, the chosen vendor has an advantage in convincing the customer to purchase additional equipment, like modems.

In theory, such a scenario sounds good but, to date, customers have tended to purchase the best pieces of equipment, which typically come from different suppliers. Vendors are not yet able to offer the benefits stemming from a full product line.

Few vendors are developing all of the products themselves. Instead, they are forging OEM deals and acquiring other companies. Historically, such deals have not fared well. A number of well-known data commu-

nications companies have added other vendors' products to their lines, only to drop them later.

Once a piece of equipment is added to a line, the vendor has to tie it to other products. Because customers want to manage all the components from a single network management console, suppliers are trying to bring new products under control of their current net management systems.

Developing such links takes a tremendous amount of resources because the new equipment was not designed to work with the network management system. Translating one vendor's network management scheme so it can be understood by a second scheme is a difficult task.

As vendors expand their markets, their sales staffs must be trained to market the new wares. The time used to train salespeople takes away from time spent finding new buyers or serving current customers.

Selling a T-1 multiplexer differs dramatically from peddling diagnostic modems, and not all salespeople can make the transition. Competent salespeople are not easy to find, and competition for good sellers is becoming more intense each day.

Vendors face the same challenges with service teams, which must also be trained and expanded.

A number of companies are branching out into two, three or even four new markets. A broad line becomes an advantage only after the supplier has tied all the products together. Right now, no manufacturer is even close to supplying such a capability. So vendors may not reap a return on the huge investments they are making now until 1989 or 1990. Consequently, suppliers need deep pockets to make the transition from niche company to complete network system supplier.

See page 18

Net upgrade hindered

continued from page 17

and private branch exchanges, used by various departments.

In November 1986, the state placed 10 Northern Telecom, Inc. SL-100s and one AT&T 5ESS central office switch at each of the offices of four different carriers serving Florida's 11 local access and transport areas. The switches concentrate voice traffic and are connected in a tandem configuration, enabling the state to operate what is essentially a private network over public facilities.

"That approach was the cheapest and promised the highest degree of flexibility," Mayne said. The equipment is maintained by Southern Bell Telephone and Telegraph Co., United Telecommunications, Inc., General Telephone Co. and Central Telephone Co.

The cutover to the voice network went smoothly except for one surprise. Three months after the network was installed, the voice requirements shot up by more than 20%. "We discovered a significant latent demand for voice services," Mayne said. "With data, there is usually a backlog of applications. But we never expected to find a latent demand for voice." Because of this, more lines were added.

Once the voice network was installed, the state turned its attention to adding data services to the network. The state now has

300,000 miles of Telpak data circuits.

"We wanted to supply our customers with subrate multiplexing capabilities," Mayne said. These capabilities would divide 56K bit/sec lines into low-speed channels, such as 4.8K bit/sec channels, which various departments can use.

The state examined a number of options, such as adding data capabilities to the Northern Telecom and AT&T switches, installing a Digital Access and Cross-Connect System (DACS) at each central office and working with D4 channel banks equipped with subrate multiplexer cards. "All the approaches were missing one or two key elements," Mayne said.

The options all lacked network management features. "The tools were limited, and we did not feel comfortable with them," Mayne said. He said the network management tools were all designed for use on customers' premises. His group wanted to control equipment at a central office, a capability none of the products offered.

Another problem was that some equipment did not support a four-wire interface, which is used to connect a private line.

Mayne's group proposed a modification to FlexServe, a T-1 service offered by BellSouth Corp. The state proposed that various channels on its T-1 lines be dropped off at a carrier's central office. Currently, channels can be divided up only on the customer's site. The state recommended that each T-1 line be connected to a DACS at the central office. The DACS would break out the voice channels, send them to the Northern Telecom or AT&T switches and connect the data channels to a carrier's digital data service.

Earlier this month, the state successfully tested the new service with two lines between its offices here and in Miami. The FlexServe modification was approved by the Florida Public Services Commission, which worked with the state during the network overhaul.

Mayne's group plans to set its rates and start taking orders for data circuits in January. In May, the state will outline a plan to migrate all the lines to the new network by the January 1990 deadline.

Mayne said Florida's situation is not an isolated case. "A number of other states are migrating from Telpak and finding the same problems." □

NSFNET boost under way

continued from page 17

NSFNET provide other institutions with access to the supercomputers, which support a variety of research activities. A spokesman for the NSF Office of Advanced Scientific Computing said NSFNET currently uses 56K bit/sec dedicated lines and is based on the Transmission Control Protocol/Internet Protocol.

IBM will build system

For its part, IBM will develop the software and provide hardware for packet-switching systems to be located at NSF supercomputer sites and regional network centers. IBM, which traditionally pitches solutions based on its proprietary Systems Network Architecture, will build a system based on TCP/IP and, over the life of the agreement, will evolve the network to Open Systems Interconnect standards.

"I'd say this is a new activity for IBM — developing a TCP/IP capability within a packet-switching structure," said Eric Aupperle, director of Merit. "IBM will be developing new software for this implementation."

An IBM spokesman said that, in addition to the new TCP/IP software, the company will provide NSFNET with its NetView network management system, 13 IBM Personal Computers RT that will monitor the network, IBM Academic In-

formation System software and two 4300 mainframes. One 4300 will run MVS and NetView at the Merit center in Ann Arbor; the other, which will run VM, will be used for conferencing.

MCI will provide T-1 links interconnecting the local, regional and national research organizations, according to the Michigan state spokesman.

The state government of Michigan, through its Strategic Planning Fund, is making a \$5 million investment in the enhancement of NSFNET.

Cooperation encouraged

According to a Merit spokesman, the faster NSFNET will "encourage cooperation among diverse fields" by making it easier for researchers to share software and other research tools. The spokesman said the network will transmit at a rate of 1.45M bit/sec, equivalent to transmitting about 50 pages of text per second.

"The NSF realized that it could not provide funding for enough supercomputers to the large body of universities conducting research," Aupperle said. "So they established network connectivity among the centers and began to fund the establishment of the regional, or mid-level, networks."

Once NSFNET is fully upgraded and expanded, it will include the original six

supercomputing sites plus seven national research computer networks, according to a Michigan state spokesman. The seven national research computer network sites will be part of the supercomputing backbone mentioned by Aupperle and will extend supercomputing capabilities to a greater number of mid-level networks.

The high-speed network will eventually link several thousand researchers working in areas requiring extensive communications and computing power — such as computer and communications technology, space exploration, medicine and defense. Aupperle said the network will be used on campuses to train graduate students on supercomputers.

Merit, formed in the 1970s, will integrate and operate the communications and switching equipment for the NSFNET, as well as build a team of support personnel to operate the network and manage its growth and development over the course of the five-year agreement.

The six NSF supercomputer sites are the San Diego Supercomputer Center; the University of Illinois at Urbana-Champaign; the National Center for Atmospheric Research in Boulder, Colo.; the Pittsburgh Supercomputer Center; Cornell University in Ithaca, N.Y.; and the John Von Neumann Center at Princeton University in Princeton, N.J. □

Being all things to users

continued from page 17

Timeplex has always prided itself on making substantial research and development investments. After examining the dollars needed to complete its planned projects, the company realized it would be difficult to maintain its healthy profit margins. In Unisys, Timeplex saw an opportunity to complete current projects, continue development of new types of products and spread development costs over two sets of products.

Timeplex was one of the healthier suppliers in the data communications market, and it carved out the largest chunk of the rapidly growing T-1 multiplexer market. A number of other suppliers find themselves in slow-growing or flat markets. How these companies plan to fund needed R&D projects is unclear.

The recent stock plunge may also hurt. Right now,

investors are extremely nervous, and even a slight dip in a corporation's profits could set off a stock-selling spree and dramatically lower a company's valuation.

Low valuations could make these companies susceptible to hostile takeovers. It could also make it more difficult for them to raise new capital to fund expansion or R&D projects.

Data communications suppliers may be overestimating their importance. One-stop shopping moves them into direct competition with major league players like IBM, AT&T and the regional Bell holding companies. These companies are positioning themselves as single-source communications suppliers as well.

IBM has been smothering its customers with technical support and is moving aggressively into the sys-

tems integration business. The company has also made a substantial investment in network management, positioning NetView as the leading package for managing a variety of equipment.

AT&T recently began wooing some of its largest customers with facilities management services, refereeing the battles stemming from the problems of linking different vendors' equipment on a single network.

During 1988, most of the data communications suppliers will begin to realize they won't make a lot of money as one-stop shopping marts. Suppliers with compatible corporate cultures will merge. Other companies will be purchased by computer manufacturers and RBHCs, if the Federal Communications Commission allows it. The traditional industry leaders will fade slowly, as Rolm Corp. has in the past few years. □



Changing Colors for T1...

TEKELEC TA

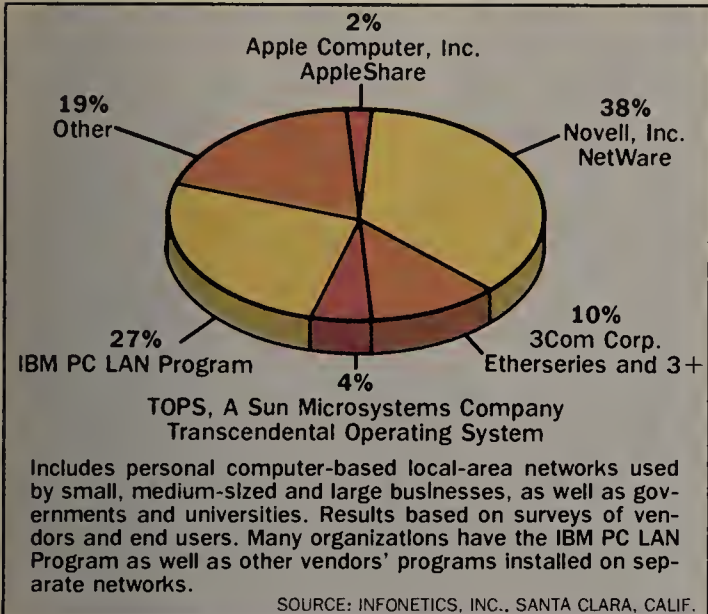
26540 Agoura Rd. • Calabasas, CA 91302
1-800-TEKFILEC

LOCAL NETWORKING

“In the case of LU 6.2, patience is a virtue. It is coming, but the understanding and development times are very long.

Maks Wulkan
Vice-president
Eicon Technology Corp.
Montreal

Network operating systems installed worldwide



NETWORK NOTES

IBM recently announced shipment of the first 20,000 copies of its new OS/2 operating system.

The new operating system, OS/2's Standard Edition 1.0, will work with the more powerful models of the IBM Personal System/2s to run multiple concurrent applications. IBM said more than 60 software developers have indicated they will write programs for OS/2.

Future releases of OS/2, scheduled for shipment in 1988, will include a graphical user interface, called Presentation Manager, that divides the display screen into windows, enabling the user to view multiple applications running simultaneously.

OS/2 Standard Edition has a one-time license charge of \$325, but IBM is offering the software to users of PC-DOS 3.0 for \$200.

Novell, Inc. announced recently the departures of Harry J. Armstrong, senior vice-president of sales, and Philip M. Lumish, president and general manager of Novell's Communications Products Division.

Armstrong is retiring to devote his time to personal business interests, Novell reported. Raymond J. Noorda, Novell's president and chief executive officer, will fill Armstrong's position until a replacement is named.

Lumish resigned in order to pursue a business he manages jointly with his son on a full-time basis. Until a new division president is named, Louis C. Cole, executive vice-president of the Novell product group, will serve as acting president and general manager.

Concord, Mass.-based **Xyplex, Inc.** recently unveiled a communications server for use in networks based on Digital Equipment Corp. VAX minicomputers. The Maxserver 5000 supports up to 15 eight-port terminal server cards, for a total of 120 connections to terminals, IBM Personal Computers, printers, modems and host computer ports.

The server accepts Xyplex's wide-area network interface card to handle speeds up to T-1 levels, permitting remote terminals to access an Ethernet link.

The basic server costs \$9,995, and each eight-port server card costs \$1,295. ■

MESSAGE-HANDLING SERVICE

Action Tech pushes MHS as net standard

Novell backs utility for distributed PC applications.

BY MARY PETROSKY

West Coast Correspondent

With Novell, Inc. as one of its first supporters, Action Technologies, Inc. is hoping its Message-Handling Service (MHS) will become an industry standard for communications among distributed personal computer-based applications.

Both Action Technologies and Novell believe MHS will spark a new class of distributed applications because it frees developers from having to write the connectivity software needed for delivering information over wide-area networks. Novell wants to use MHS to keep its own sales and inventory records up to date, so it has asked developers of some of the applications it uses to support MHS.

MHS is a store-and-forward utility aimed at applications that must communicate or share data over local- and wide-area networks. MHS can be used to create messages and files: Messages spark some action, such as updating a data base or printing a report, while files can contain reports, updated data or executable programs. The utility sits on top of an operating system, and applications are then layered on top of MHS.

Action Technologies expects MHS to be distributed by hardware and system software vendors such as Novell, who will bundle it with their system-level products. These vendors must license MHS, while software developers need only buy a developer's kit. Application developers gain access to MHS through subroutines they build into their programs.

Action Technologies based MHS on X.400, the international electronic mail standard. It will be completely compatible with X.400 in 1988, said Richard Mellinger, president of the company. In addition, MHS could be used as a transport mechanism to support information that conforms to electronic data interchange standards, Mellinger said.

One of MHS' key benefits is that applications that support it can update multiple dispersed data bases at specified times, according to several software developers currently implementing the service. These updates are done automatically, without the user having to start up a communications or E-mail program.

And because it is a store-and-forward facility, users have the flexibility to configure their networks to get the best balance between communications costs and the need for up-to-the-minute data, these developers said. For example, users could use dial-up lines to send updates multiple times during the day as opposed to paying the higher costs of leased lines for continuous updates.

Currently, MHS applications can run on IBM Personal Computers and NetWare or MS-DOS 3.1-compatible local networks, such as those from IBM, 3Com Corp., Banyan Systems, Inc. and Ungermann-Bass, Inc. A Macintosh version of MHS is due out in 1988. Novell has also stated it is interested in seeing MHS supported in the Unix environment.

In addition to wide-area networking capabilities, MHS provides work-group addressing, security features and support for message-format

See page 52

LANMARKS

ERIC KILLORIN

A beautiful friendship

“I think this could be the beginning of a beautiful friendship.”

You may recognize that line from the conclusion of “Casablanca.” It serves as an apt introduction to the role IBM is playing in the local-area network industry today and the relationship of its OS/2 operating system for the Personal System/2 family to networks of personal computers and servers. The marriage of OS/2 with networking functions at the server is indeed a relationship worth noting, but its beauty has yet to be determined.

A past column (“3Com, Novell in war of the words,” NW, Nov. 30) described IBM's

Killorin is the publisher of “Netline,” an industry newsletter on computer networks, a publication of Hyatt Research Corp. in Andover, Mass.

position with regard to OS/2 and the operating system's effect on two leaders in the independent local-area network movement. 3Com Corp. is adapting its 3+ networking software at the server, to be introduced as 3+ Open, to comply with the OS/2 LAN Server. Novell, Inc., on the other hand, will continue to support NetWare at the server but will support OS/2 at the workstation. Through various interfaces, Novell will ensure compatibility between NetWare and OS/2.

Microsoft Corp. has stated its position on the subject, which is that OS/2 at the server is the way to go: “If the server is running a different, proprietary operating system, then developers and users must deal with added complexity in terms of education, administration, develop-

See page 22



There For You.

When you get The CROSSNET Effect_{SM}, you get a lot more than the smart products that make up a CROSSNET_{TM} system. You also get the benefits of doing business with Tellabs.

Tellabs will always be there for you. Which often means being there with you. We start with an evaluation of your network, followed by a detailed proposal outlining how CROSSNET can satisfy your particular needs. Feature by feature, we'll build you a CROSSNET system that's custom

fit to those needs. A system that's cost-effective, and can grow as your needs grow. A system that's a comprehensive network solution.

The CROSSNET Effect also gives you extensive hands-on training, before installation and as an ongoing service. And any technical support you might need is always there for you at regional Tellabs offices across the country.

Of course, at the heart of The CROSSNET Effect are the

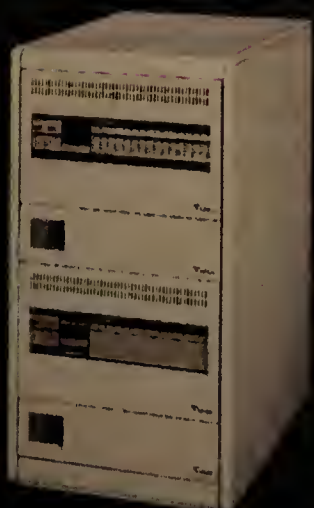




There With You.

smart products that make up a CROSSNET system. Smart because they give you intelligent network management and single-point network control.

From a single control terminal, you can configure each network node, automatically – by time-of-day or event – or on demand. Intelligent DS1 switching provides automatic



rerouting around failed facilities. And an integral CSU accommodates enhanced network diagnostics for faster problem resolution.

The smart solution to your networking needs is here for you today. Just give us a call and you can get it. The CROSSNET Effect.

Get The CROSSNET Effect.SM

A beautiful friendship

continued from page 19

ment and maintenance. With the advent of OS/2 running on the server, these problems are solved." Recall that Microsoft has worked with IBM on OS/2 development, and the microcomputer software powerhouse has also worked with 3Com on the OS/2 LAN Server. So we wind up

with Novell being the odd man out.

A far more important issue looms on the horizon, however. Some recent debate suggested that shipments of OS/2 are lagging, despite IBM's claims that some untold zillion Personal System/2 machines are now humming on custom-

ers' desktops.

Like the ubiquitous eight-bit CP/M operating system of six years past, the infinite variations of MS-DOS will have a long shelf life, too, despite IBM's efforts to migrate its customers to OS/2. Many users do not need 32-bit horsepower and the software overhead that comes with it; DOS on a Personal Computer XT does just

fine, thank you.

And with its middle tier giving way to the likes of Digital Equipment Corp. and even Sun Microsystems, Inc. and Apollo Computer, Inc., IBM is justifiably worried about its ultimate trump card: OS/2 and the notion of Intel Corp. 80386-based desktop computing.

It seems the only company making any real money

from 80386s is Compaq Computer Corp.

But what does this mean for local-area network managers who question upgrading their personal computer networks to OS/2? And what does it mean for large installations where the implementation of links between clusters of personal computers and host systems can no longer be avoided?

The real issue may not be whether Novell runs OS/2 alongside NetWare or whether 3Com wins the next battle in the local network war, although that makes for good press.

SAA, the real issue

The real issue is IBM and how successfully its Systems Application Architecture (SAA) scheme of retroactive compatibility can be applied to OS/2 and the several file structures now running on its mainframe systems.

Connecting personal computers to a departmental server is no longer the source of sleepless nights among MIS planners in the Fortune 500. What is critical is establishing transparent links among processors of many classes and, indeed, among processors running different file structures.

The nature of the computing world is heterogeneous. Like the local net industry itself, no single cabling scheme or accessing protocol will dominate. VMS, Unix, DOS, VM and OS/2 will all have to coexist.

Firms such as Sun Microsystems and Apollo recognize this and have found a most receptive market for their notion of Network Computing ("The age of network computing," *NW*, Nov. 16). The use of remote procedure calls to establish local network connections at the upper layers works and works well.

If the local networking industry is to mature, it must adapt to the environment of its own creation: support for multivendor connections.

"One operating system, one solution" — to borrow from DEC's President Ken Olsen — is indeed attractive, but, for this approach to work outside of a single vendor's fold, it must be open enough to allow applications based on other operating systems to be ported to a network environment easily.

The key is applications, and users will judge the merits of OS/2 based on what they can do with it today. ■



Think Of Us As An Uncommon Carrier.

What is Bay Area Teleport?

Much like an airport or seaport, we are a focal point where modern business communications come together.

If you are or aspire to be a Fortune 1000 company, you should take advantage of Bay Area Teleport, which provides direct service to long-distance and international carriers on a private, secure digital network. This allows you to realize substantial savings over existing rates for telephone, text, video and data transmission — and significantly reduces the possibility of service interruption.

Simply put, Bay Area Teleport enhances your ability to communicate. We save you time and money by linking together the many different ways your business sends and receives information.

Which makes our service not only uncommon — but well worth investigating.



**BAY AREA
TELEPORT®**

For additional information call (415) 769-5300, or contact John G. Harrison, General Manager, Bay Area Teleport, Harbor Bay Business Park, 1141 Harbor Bay Parkway, Alameda, California 94501.

Harmon

COMMUNICATIONS MANAGER

“In the last 10 years, an onslaught of new technologies has revolutionized the workplace, with hundreds of product vendors bombarding those in corporate management with technology options. Few executives, however, have taken time to step back and ask what these technologies have meant to corporate organizations and the office work force.

John Connell
Executive director
Office Technology Research Group
Pasadena, Calif.

► CHANGE OF COMMAND

Appleby takes TCA reins

New president set to guide ambitious expansion program.

BY MICHAEL FAHEY
Senior Writer

PHOENIX — The Board of Directors of the Tele-Communications Association (TCA) recently chose Jerry Appleby as its new president, a role that will see him lead the group during the initial stage of its planned five-year expansion program.

Appleby, who ran unopposed for the TCA office, is an assistant vice-president at Security Pacific Automation Company, Inc., a subsidiary of Security Pacific Corp. On Jan. 1, he will succeed Lionel Gillerman, manager of network technology at McDonnell Douglas Aerospace Information Services.

Gillerman will serve as TCA chairman for one year, succeeding Prince Dyess, director of telecom-

munications at the Scripps Clinic and Research Foundation in La Jolla, Calif.

In addition to directing the expansion program, designed to take the group beyond its Western roots into a national and international organization, Appleby will help steer the TCA to a new convention site. The group has outgrown the traditional site of its annual conference and exposition, the Town & Country Hotel and Convention Center in San Diego, and will be moving to another location following its 1988 annual get-together. While no definite plans have been made, Appleby said there is a good possibility the TCA's annual show will move to San Diego's new civic convention center, which is currently under construction.

He said the TCA is now engaged

in discussions with a number of users who have expressed an interest in forming new TCA chapters. “We are taking a number of approaches,” Appleby said. “We’ve talked with individual users who have been in contact with other users in their areas. We also have TCA members located in states where there are currently no chapters, and they have spoken with users about forming chapters.”

In addition, TCA has held talks with existing users groups interested in joining TCA.

“We want to stress the idea that we are not being predatory in our expansion efforts,” he said, adding that the TCA's expansion plans were prompted by users interested in bringing TCA chapters to their areas. “We have been approached by a number of users, and we are



Jerry Appleby

conducting follow-up discussions.”

Appleby credited the TCA's success in attracting members to its local approach, which revolves around monthly chapter meetings. The group currently has seven

See page 24

ASSOCIATIONS

The **Quotron Users Group**, which is part of the **Wall Street Telecommunications Association**, hopes to reach an agreement with **Quotron Systems, Inc.** regarding new dial backup procedures for the stock quote service.

The users group wants the company to allow users to initiate dial backup procedures themselves when necessary, rather than having to wait for a Quotron technician to make a site visit. Phyllis Lampell, president of the Wall Street Telecommunications Association, said the users would like to have the change in backup procedures in place during the first quarter of 1988.

The **Building Industry Consulting Service International (BICSI)** will hold its 16th annual conference Jan. 18 to Jan. 21 at the Holiday Inn International in Tampa, Fla.

Roy Merrills, group vice-president of Integrated Network Systems for Northern Telecom, Inc., will deliver the keynote address at the conference, which will focus on telecommunications design in buildings. In addition to seminars and discussions related to telecommunications cabling and other low-voltage wiring in buildings, the conference will include sessions on management and career advancement.

The cost of the conference is

See page 24

GUIDELINES

ERIC SCHMALL

Testing the waters of telecom education

Faced with the uncertainties wrought by technological and regulatory change, the bewildering array of product choices and the insecurity that accompanies making difficult decisions, communications managers have increasingly turned to telecommunications seminars as a source of comfort and salvation.

What they now find in reviewing the dozens of competing seminar brochures and manuals is a bewildering array of choices and the insecurity of making a difficult decision. Communications professionals, so much in need of a road map, need guidance on choosing the right mapmaker.

The fastest growing aspect of modern telecommunications is no longer in technical labs, switching offices or legislative corridors; it is in the deluge of professional educational materials that flood the manager's in-basket each week. Hardly a

Schmall is network systems manager for an insurance holding company.

day passes without some group warning the recipient of the need for more education in some aspect of this field.

What the industry needs is guidance on the best courses offered. Until that day arrives, some general observations on the similarities of the offered courses may be helpful.

The groups that want to enter into this lucrative field display a remarkable number of similar characteristics. The most obvious trait is cost. The going rate is almost universally \$300 per day, with most course lengths averaging three days. The class sites are almost completely represented by half a dozen cities: New York, Los Angeles, San Francisco, Chicago, Dallas and Washington, D.C.

Common themes can also be found in the course descriptions. Most list an exhaustive series of subtopics to be covered in a three-day period, some exceeding 100 separate items. While this display is designed to assure the participant

See page 24

DIALOGUE

Do the recent improvements in Centrex, especially digital Centrex, make it more competitive with private branch exchanges?

“We currently have a PBX installed, and that is enough for our needs. It's inevitable that Centrex would offer more capabilities in order to stay competitive. In the future, there might be some time when it might be useful for us to take advantage of some of those capabilities.

Robert Riley
Biomedical engineering/
telecommunications
Tacoma General Hospital
Tacoma, Wash.

“I personally feel that the local operating companies have been pushing Centrex hard, wielding their purchasing power to make Centrex a leading-edge product. On the features side, digital Centrex is competitive with most PBXs, as far as the user controlling his own environment — moves, adds, changes and so on.

They're also moving on the data side, closing the gap with PBXs.

The key thing we see is that people feel if you have Centrex, you're not the master of your own ship and that the local operating company will not bring technology along as fast as you may want them to.

That's a fallacy. They have to

See page 24

Testing telecom education

continued from page 23

the course is comprehensive, it also causes considerable anxiety over the course's depth. Nobody needs a survey of technology from an altitude of 35,000 feet and at a speed of Mach 3.

The majority of catalogs display portraits of their instructors, along with brief biographical sketches vouching for their expertise. Almost all are consultants in the field with varying degrees of experience. These organizations promote themselves using astonishingly similar materials. Many of the pamphlets are slick productions

with eye-catching covers, tightly compressed narratives and breathless introductions to their approaches to education.

Endorsements from past alumni are de rigueur, and the list of other institutions that have sent people to these courses always includes all branches of the U.S. Armed Forces and most of the Fortune 100. In addition, you can be assured that after receiving one copy in the mail, three more will arrive within a week.

One naturally wonders how much course costs might be reduced if these paragons of the information age would sort their mailing lists and eliminate duplicate names and addresses.

An informed selection requires additional information. This can be obtained by checking with other colleagues in the profession to see what experiences they might have had with either the particular course or the education group.

Even then, the prospective student would be well-advised to contact the course instructor to ask some questions about the subject area. Not only can this help the student understand the true focus of the course — despite the boilerplate listed in the catalog — it will also give the inquirer a sense of what the instructor is like.

Such a conversation will yield a great deal about how familiar the teacher is with the material and,

more importantly, how articulate the teacher is. As every student knows, there are doers and there are teachers. Finding a person with both sets of skills is a rarity.

The final test, of course, is to try a course. Like so many other uncertain aspects of this field, one finally has to test previously untested areas. At \$900 per course, these are not career-killer matters. With luck and perseverance, managers will find favorite education sponsors or institutes that regularly meets their staffs' needs for technical development.

Until educational institutes stop copying one another, this will be the best way for managers to pursue technical instruction. **Z**

Associations from page 23

\$225 for BICSI members and \$255 for nonmembers who register before Jan. 8. For participants who enroll after Jan. 8, the cost is \$275 for BICSI members and \$305 for nonmembers.

Arrangements for attending can be made by writing to Larry Romig, executive director of BICSI, University of South Florida, LLL 012, Tampa, Fla., or calling (813) 974-2695.

The **Wisconsin Healthcare Telecommunications Association** will hold its next meeting at the Westwood Conference Center in Wausau, Wisc., on Jan. 29. The meeting will explore revenue-generating concepts for the telecommunications department in health care institutions. Patrick M. Monahan, president of Monahan Associates, Inc., a Glendale, Wisc., communications-based consulting company, will be the featured speaker at the meeting.

The **National Association of State Telecommunications Directors (NASTD)** is drawing up a comprehensive survey of state telecommunications organizations. The survey will examine the services and equipment used by telecommunications departments in the 50 states.

In addition, the survey will examine organizational and compensation issues in state telecommunications organizations. The survey results will be released during the group's annual meeting in Boston next fall.

Appleby takes TCA reins

continued from page 23

chapters, one each in Arizona, Northern California, Southern California, Greater San Diego, Oregon and Colorado, and a Northwest chapter encompassing Washington state and Idaho.

Appleby declined to comment on whether the TCA would join the Corporation for Open Systems (COS) as a voting member, except to say that the issue is being studied by the TCA. Ultimately, the decision to join will hinge on whether or not membership in COS is beneficial to a large number of TCA member companies, he said.

Appleby, who has a bachelor of science degree from the University of Denver, currently works on legal, regulatory and future telecommunications industry issues for Security Pacific. He played a major role in the installation of a new Northern Telecom, Inc. SL-100 in Security Pacific's Los Angeles headquarters last summer, and he has supervised the installation of dozens of phone systems around the country for Security Pacific.

"The banking industry is wonderful for anyone interested in telecommunications," Appleby said. "More and more, the industry is looking to telecommunications to provide new tools for doing business. ATM, point-of-sale and alarm networks are just a few examples."

The Southern California native got his start as telecommunications manager with Carte Blanche in 1977, after working with the com-

pany as a computer programmer.

He said the Carte Blanche telecommunications manager came to him with magnetic Centrex billing tapes from Pacific Bell and asked him if he could do anything with them. Appleby, who had previously developed station message detail recording software while working for a now-defunct West Coast telecommunications software house, developed a program to track Carte Blanche's telecommunications costs. The program, which included flexible routing procedures, saved \$60,000 the first month.

He later took over as telecommunications manager, and he joined the TCA in 1978. He said it was during his time as a novice telecommunications manager that he learned the value of meeting his peers though the organization. "I went to my first convention in 1978 and talked to users and vendors every day from morning to night," he said. "When I wasn't discussing the business with people, I was eavesdropping on other people." Appleby joined Security Pacific in 1981.

According to Appleby, regulatory and tariff matters will be among the most important concerns facing telecommunications users in the upcoming years. He vowed to keep the TCA working on behalf of end users in regulatory and legislative matters.

The group will be active in opposing increased access charges, Appleby said. In addition, it will take a stand against efforts to impose municipal and state taxes on telecommunications services. **Z**

Dialogue from page 23

bring it current, make it leading-edge, in order to stay competitive. I look for 1988 to be a year in which Centrex will take a pretty big leap in the marketplace.

Tim Radell

Telecommunications consultant
Inland Steel
Gary, Ind.

"Yes, for a number of reasons. For instance, the manpower issue. If you don't have to run it yourself, there's a savings — also, because it's somebody else's property.

Featurewise, the tariffs are not quite so rigid as far as what you're able to obtain from the BOC. The switches can offer an increase in the amount of things you can do. And finally, it doesn't typically involve a capital expenditure.

Bill McWaid

Manager of traffic engineering
Motorola, Inc.
Schaumburg, Ill.

"We have a distributed environment, with PBXs in our 52 stores throughout a two-state area. We use AT&T System 75s in our stores and System 85s in our offices.

The changes in Centrex wouldn't attract us because of the large [PBX] investment we've made. I think Centrex would be more advantageous to a smaller company or a network in a smaller area. Since we cross LATA boundaries so often, Centrex wouldn't be very attractive.

Doug Sikma

Telecommunications analyst
Meijer, Inc.
Grand Rapids, Mich.

The One Investment You Can Depend On



CASE 4000+ series diagnostic modems and their two-year warranty

Forget Wall Street. Today's best investment is waiting for you at CASE.

Across the board, we're pushing the limits of modem performance. That's why we're backing every 4000 modem with an unprecedented two-year warranty!

If any modem in your 4000 network fails during that time, we'll fix it or replace it — FREE!

Remarkable dependability is the reason we can make this guarantee. The 4000 provides a full range of diagnostic features. As well as high-speed synchronous transmission over dedicated lines. And your choice of point-to-point, multi-point, and fast-polling applications. For information on this sure investment, return the coupon or call us today.

800-227-3134

CASE

CASE Communications, Inc.
7200 Riverwood Drive
Columbia, Maryland 21046-1199

Please send me more information on the CASE 4000+ series of diagnostic modems and their unique guarantee.

Name _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone _____

NEW PRODUCTS AND SERVICES

See inside for:

- Datability RAF Print Server
- Opcom's Adaptive Integration software upgrade

► *DEXPO WEST 87*

Connectivity in show's spotlight

DEC-to-Apple links take center stage.

BY MARY PETROSKY
West Coast Correspondent

ANAHEIM, Calif. — DEC-to-Apple connectivity was among the hot topics at DEXPO West 87 here last week, and several products that link Digital Equipment Corp. and Apple Computer, Inc. computers debuted.

Alisa Systems, Inc. launched a release of TSSnet that supports Ethernet. TSSnet is Alisa's package that allows the Macintosh to hook into DECnet. Alisa also introduced software that allows Macintosh programs to access information in SQL data bases on DEC VAXes. Kinetics, Inc. introduced an Ethernet interface card for the Macintosh II. It links the Macintosh II with other computers, such as DEC VAXes, on Ethernet networks.

Also at DEXPO West 87, Walker Richer & Quinn, Inc. showed off a new terminal-emulation package, Reflection 4, that enables an IBM personal computer to emulate the Remote Graphics Instruction Set (REGIS) color graphics of DEC's VT340 terminal.

The new release of Alisa's TSSnet supports Kinetics' Ethernet interface cards and an external small computer system interface (SCSI) port-to-Ethernet adapter. When connected to an Ethernet network in either of these ways, Macintosh systems can use both DECnet and Apple's AppleTalk

protocols, giving users access to both DEC and Apple networking services. In addition, a VAX/VMS user can copy files to and from a TSSnet-equipped Macintosh by using the remote file access service provided with VAX/VMS.

TSSnet supports Ethernet connections, DECnet Network Virtual Terminal and enhanced DECnet/VAX Mail service. It is compatible with Macintosh II and MultiFinder background terminal emulation and file transfer. The previous release of TSSnet supported only asynchronous connections.

TSSnet services operate with DEC systems running VAX/VMS, Ultrix, RSX 11M/M+ or RSTS/E. Access to IBM hosts through DEC's SNA Gateway is also supported.

Alisa's SequeLink consists of software for both the Macintosh and the DEC VAX. It establishes a network link and uses SQL to allow select programs on a Macintosh to query, update, create and manage an Oracle Corp. data base on a VAX. SequeLink can operate over either an AppleTalk or DECnet network. SequeLink supports Apple's HyperCard application and 4th Dimension, a data base application from Acius, Inc.

Alisa also introduced SequelView, a 4th Dimension application for query and data capture that uses SequeLink. SequelView is included with SequeLink. Alisa is looking at supporting other data

bases on the VAX as well as other Macintosh applications.

TSSnet is priced at \$495 for a single copy; quantity discounts are available. Although exact pricing was not available at press time, Alisa President Robert Denny did say the Macintosh component of SequeLink would be priced under \$500, and the VAX portion would run from \$2,500 to \$12,000, depending upon configuration.

Kinetics, a wholly owned subsidiary of Excelan, Inc., expanded its Macintosh line of connectivity products with the introduction of EtherPort II, an Ethernet interface card for the Macintosh II.

With the appropriate software, Macintosh II users can now communicate with DEC VAXes, Unix-based systems and IBM Personal Computers. Either Kinetics' Transmission Control Protocol/Internet Protocol software or Alisa's TSSnet can be used to communicate between Macintosh IIs and DEC VAXes.

Priced at \$795, the EtherPort II is the first development effort between Kinetics and Excelan. Volume shipments will begin at the end of the first quarter of 1988.

Walker Richer & Quinn is also slated to ship its Reflection 4 emulation package at the end of the first quarter. Reflection 4 provides VT340 REGIS color graphics emulation, as well as complete emulation of DEC's VT241 terminal and Tektronix, Inc.'s 4014 terminal.

Reflection 4, priced at \$299, features multitasking, keyboard remapping, DECnet DOS's Local Area Terminal protocol for DEC terminal services and proprietary file transfer to VMS and Unix/Ultrix hosts. Reflection 4 Plus, priced at \$349, also provides personal computer-to-host backup facilities and local-area network support. □

First Look

■ **X.25 packet-switch/line-concentrator unit bows**

Advanced Computer Communications (ACC) introduced a desktop unit that switches local X.25 traffic and enables up to six local X.25 lines to share a single trunk line to an X.25 network.

The **ACC 8250** supports up to six local X.25 lines, each of which can support a single packet assembler/disassembler or a host computer with X.25 capabilities. The unit switches packets between those lines. Packets from all six local lines can also be concentrated onto a single 64K bit/sec X.25 network trunk. The unit also directs packets received from that trunk to the appropriate local line.

The unit features menu-driven software that enables administrators to create necessary X.25 routing tables from any terminal that can attach to any of the six lines or the trunk line. From that terminal, the administrator is also able to define operating parameters, monitor performance and retrieve usage statistics.

The unit supports the CCITT's Link Access Procedure B error-checking scheme and is supplied with a Motorola, Inc. 68000 microprocessor with 512K bytes of random-access memory. The ACC 8250 is priced at \$6,500 and is available immediately.

Advanced Computer Communications, 720 Santa Barbara St., Santa Barbara, Calif. 93101, or call (805) 963-9431.

■ **Racal-Vadic debuts modems, auto dialer**

Racal-Vadic, Inc. introduced a pair of synchronous rack-mountable modems and an autodialing unit that can be used in the firm's MDS II modem network.

The **VA9691FT** modem operates at 9.6K bit/sec and is compatible with CCITT V.29 and V.27 recommendations. It is the first 9.6K bit/sec for the MDS II modem network.

The **VA4891T** operates at 4.8K bit/sec and is compatible with Bell 208 and 201 standards as well as CCITT V.27 and V.26 recommendations. The unit automatically detects whether the remote modem it communicates with is a Bell 208- or 201-compatible unit and adjusts to the appropriate operating mode.

Both new modems support transmission via two-wire dial-up or two- or four-wire leased lines. Up to 16 of the new modems can be

See page 26

► *NORTH AMERICAN TELECOMMUNICATIONS ASSOCIATION*

Phone products debut at conference

BY JIM BROWN
New Products Editor

DALLAS — Attendees at the recent Unicom 1 Computers and Communications show here were treated to more than 70 telephone-related product introductions.

The show, sponsored by the North American Telecommunications Association (NATA), gave a variety of vendors a forum for their wares. Toshiba America, Inc.'s Telecommunications Systems Division of Irvine, Calif., unveiled an expansion cabinet

and new software for its Perception II digital private branch exchange. The company also added new features to its Strata key systems, which support between two and 56 users.

The expansion cabinet doubles the capacity of the Perception II to 64 trunks and 240 stations. New Perception II software enables the PBX's station sets to support such features as autodial, access to system speed-dialing numbers and three-party conferencing. The software increases the number of speed-dialing numbers supported to 1,090.

Toshiba also introduced a Release 2 features package for its Strata Se, VIe, XIle and XXe electronic key systems. Included in the package is a modem board residing in a Toshiba electronic telephone set. An IBM Personal Computer or asynchronous terminal can be linked to the modem via RS-232.

It can then use the telephone set's twisted-pair wire to communicate with other Personal Computers or terminals at speeds of 1,200 bit/sec through the Strata key service unit.

See page 26

Racal-Vadic from page 25 installed in a single MDS II modem chassis. Both also have integral autodialers supporting Racal-Vadic's Synchronous Auto Dial Language, which enables the modem to link to networks supporting High-Level Data Link Control, IBM 3270 or Binary Synchronous Communications protocols.

The **VA901** autodialer includes four AT&T 801-compatible autodialers on a single board. It is compatible with Racal-Vadic's Multiple Access Calling System protocol as well as its existing VA811 and VA831 autodialers. The VA901 is installed in a MDS II chassis and stores frequently dialed numbers in its memory, enabling a modem user to enter a few digits in order to dial an entire number.

The VA9691FT costs \$1,995, and the VA4891T is priced at \$1,695. The VA901 autodialer costs \$1,195.

Racal-Vadic, Inc., 1525 McCarthy Blvd., Milpitas, Calif. 95035, or call (408) 432-8008.

Software makes PC printer act as VAX system printer

Datability Software Systems, Inc. released software that lets an IBM Personal Computer-attached printer act as a Digital Equipment Corp. VAX system printer.

The firm's **RAF Print Server** works with its Remote Access Facility (RAF) software. RAF makes IBM Personal Computers appear to a DEC VAX as DEC VT-100 terminals. Running on the Personal Computer, RAF communicates via Ethernet or dial-up connections with RAF software running on the VAX. VAX print jobs are routed from a VAX print queue to the personal computer printer via RAF.

A copy of the RAF Print Server, priced at \$495, is required for each Personal Computer printer to be connected to the VAX. Each Personal Computer linking to the VAX must run a \$395 RAF package. A VAX RAF package supporting multiple Personal Computers is \$395.

Datability Software Systems, Inc., 322 Eighth Ave., New York, N.Y. 10001, or call (212) 807-7800.

Opcom enhances its DIAL voice processor

Opcom announced software enabling its Direct Access Link (DIAL) call-processing system to automatically route unanswered calls to operators as opposed to voice mailboxes.

Adaptive Integration is a software upgrade for the DIAL processor, which can be integrated with several private branch exchanges and supports automated call answering, voice messaging, interactive voice response, voice mail and audiotext functions.

With Adaptive Integration, DIAL can automatically forward calls from unanswered or busy extensions to a secretary or operator, rather than to a voice mailbox.

With the new software, DIAL plays a voice prompt informing the

caller the call is being forwarded. When the secretary picks up the forwarded call, the new software prompts DIAL to inform the secretary verbally which extension the call has been forwarded from.

If the secretary does not answer the call, DIAL follows the same procedure to forward it to an operator.

Additionally, Adaptive Integration can be configured to give callers the option of automatically transferring to a secretary or pressing the star key on a push-button phone to leave a voice message.

Adaptive Integration can also be configured to forward internal calls to a user's voice mailbox automatically, where a message record-

ed especially for internal callers is played.

The new software also lets DIAL's automated answering function determine what day and time it is, enabling it to play a prerecorded message that would, for example, inform a caller an office is closed for a holiday.

Adaptive Integration costs \$5,000. Versions working with Northern Telecom, Inc.'s SL-1, NEC America, Inc.'s 2400 and Hitachi America, Ltd.'s DX PBXs will be available early in 1988. The Northern Telecom version will also require a \$5,000 Northern Telecom SL-1 Interface Card on the SL-1.

Opcom, 110 Rose Orchard Drive, San Jose, Calif. 95134, or call (408) 943-0878.

Phone products debut

continued from page 25

Other features in Release 2 include the ability to pick up a call on hold from another telephone, an off-hook call announce capability, a remote maintenance function and a voice-mail interface.

Release 2 enables the Strata Se and Vle to operate in conjunction with Centrex. Strata XIIe and XXe systems already offered that capability. With the new package, each Strata, except the Strata Se, will support least-cost routing.

The Perception II expansion cabinet is currently available, and the Strata Release 2 features package will be available in early 1988.

How confident are we that our products will win any serious evaluation?

through Toshiba dealers. Pricing for the new products has not been set.

Los Gatos, Calif.-based Telenova, Inc. announced an expansion cabinet for its Telenova 1 PBX, along with new telephones.

The expansion cabinet features a Group Network Interface (GNI), which links it to the host cabinet. The GNI replaces the Control Processor Switch in existing cabinets and enables users to expand Telenova 1 capacity to 200 users with the addition of 80 ports. To finish the expansion, users must install an Intel Corp. 80286 microprocessor, which speeds communications between the cabinets.

The firm also introduced the Telenova Station Set 100, a display

phone that features an RS-232 port. That RS-232 port can be used to connect an IBM Personal Computer or asynchronous terminal to the telephone. Both the telephone and Personal Computer or terminal then share the existing telephone wire to the PBX.

The new phone supports a serial port that enables users to attach additional line-monitoring modules to the basic set.

Telenova also enhanced its Basic Operator Station Set with a four-line LCD screen that displays up to 40 characters per line. The screen informs the operator where incoming calls originated and gives the operator either the name of the person or the extension number a calling party is trying to reach.

In addition, Telenova introduced a Multi-line Station Adapter that attaches to its Telenova Station Set display phone or Basic Operator Station Set via a serial port.

The 10-button add-on module enables either telephone to monitor the status of 10 extensions. Working with software in the switch, the adapter determines which extensions are busy and how many calls each extension has on hold. The Telenova 1 lets users place as many as nine calls on hold. An attendant can send a message to the display screen of that extension, reminding the user of the number of calls on hold.

Lastly, the firm introduced the Telenova Feature Phone, an analog version of the Telenova Station Set

that comes with 11 feature keys. It is designed to work stand-alone or with the Telenova 1 PBX.

Telenova said it expects its distributors to sell the expansion cabinet for between \$5,000 and \$7,000, while the enhanced Basic Operator Station Set will sell for less than \$1,000. The Telenova Feature Phone will cost less than \$100. Pricing for the Telenova Station Set 100 and Multi-line Station Adapter has not been set.

Comverse Technology, Inc. of Woodbury, N.Y., introduced Faxlogue, software and hardware that adds facsimile capabilities to its Trilogue voice-messaging system. Trilogue is capable of supporting up to 5,000 users. It supports as many as 32 ports and 182 hours of digitized voice storage. Also, Trilogue can be integrated with digital PBXs and Centrex service.

The Faxlogue product enables Trilogue to receive and store facsimile transmissions in users' personal mailboxes. Users dialing into Trilogue enter a personal identification code via a telephone keypad to access their mailboxes. They then hear a system-generated voice recording, which informs them if a facsimile document has been stored.

The user can retrieve a document by entering the telephone number of a facsimile machine that will print the document. That facsimile can be forwarded to another user's mailbox and a voice-mail note can be attached to it.

In addition, Faxlogue will send a facsimile-waiting indication to the user's telephone similar to the way Trilogue sends a command for a PBX to light a voice-message waiting lamp on the user's telephone.

Faxlogue will be sold through distributors. Pricing has not been set.

Dallas-based Shared Resource Exchange, Inc. (SRX) introduced its Trader Branch Exchange (TBX) aimed at securities and commodities brokers. The TBX consists of hardware and software added to SRX's System One digital PBX, enabling the switch to be interfaced to existing turret phone systems.

A turret telephone system is primarily used to link brokers in offices to traders on an exchange floor via private telephone lines. For example, when a broker picks up a turret telephone, it will automatically ring a turret telephone on the trading floor.

The TBX is designed to enable brokers and traders to use existing turret telephones to ring telephones in their firms' administrative offices.

The TBX hardware consists of a three-port Shared Loop Ringdown card, which enables lines linked to the SRX system to be connected to the turret system. TBX also includes station message detail recording software that records the number of calls made from the turret system. That software assists telecommunications managers to pinpoint underutilized turret lines.

The retail per-line charge for a TBX, which supports connection to 100 to 150 turret lines, will cost between \$650 and \$750. □

This confident.



Free 30-day
evaluation
package.

To really appreciate quality in network working products, there's simply no substitute for hands-on evaluations.

Likewise, you have to try out customer service and support to evaluate the quality of a supplier.

That's why we're ready to send you the equipment you need—configured to your requirements—to build your own wide-area data network. You test the network in your own environment for 30 days, with the full support of our Field Service and Technical Support Centers.

Best of all, this evaluation is offered at no cost or risk to you.

Discover why thorough performance and quality evaluations have helped us win over 1,500 companies around the world.

You owe it to yourself to see what the best can do.

Our customers rate us #1.

A *Data Communications* user study shows that ComDesign is rated highest in overall performance among 16 manufacturers receiving the most responses, a rating that includes ease of operation, ease of expansion, hardware reliability and manufacturer's maintenance service/technical support.*

When you join ComDesign, you've made the best connections in datacom.

You need to team up with a supplier that will keep your capabilities current. No matter how large you grow or how much things change over time.

As a subsidiary of Network Equipment Technologies (N.E.T.™), ComDesign offers its customers all the benefits of an open-ended upgrade path, integrated network management, and the strongest customer service and support in the industry.

Our evaluation offer:

Call our Evaluation Hotline. We'll work with you to determine exactly what you need.

If our program fits your needs, we'll arrange to have evaluation units or a fully configured network sent out to you immediately.

But hurry. We wouldn't want you to miss out on this limited-time offer!

You just need more information? Call for our Fall 1987 Product Guide.

Evaluation Hotline:

1-800-235-6935. Ask for Department M 14



ComDesign®

A Network Equipment Technologies Company

26 Castilian Drive, Santa Barbara, CA 93117 (805) 685-1411

The best connections in datacom.

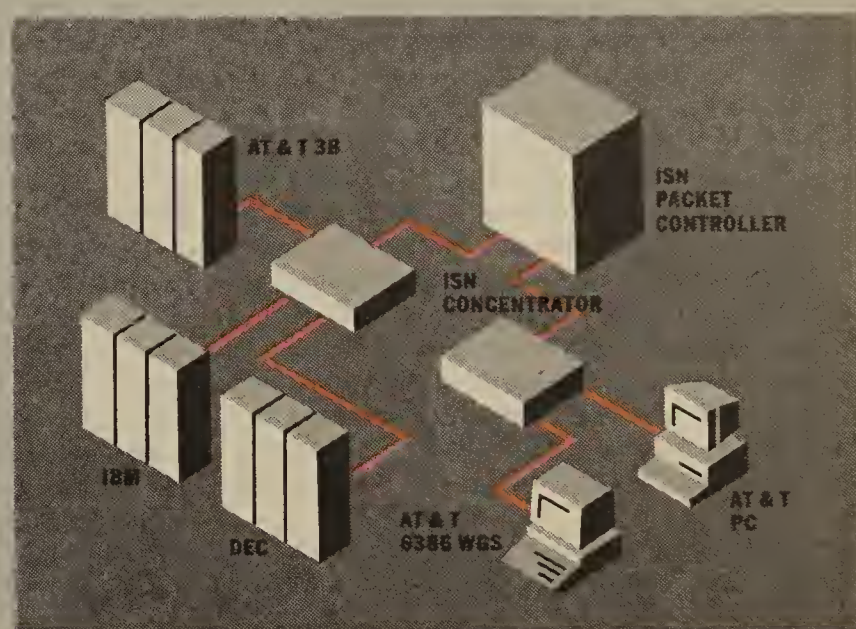
*Taken from *Data Communications*, July, 1987. The 16 manufacturers mentioned received five or more user responses.



“Our Executive Committee doesn't have a clue how fast computers change.”

The Executive Committee people we spoke to off-line don't realize that they're placing a long-term bet on the computer network we choose today. They look at computers in their own shop and figure networks are just the wires that connect them. So before Gail gets into AT&T's ISN, I'll get them thinking. Looking across the table at the guy who's got a DEC[®] or an IBM system and saying 'Hey, we need a network that can work with just about anybody's boxes. And still be here after some of those boxes are history.' Then Gail presents ISN, chapter and verse. Finally, you get up and remind them of what AT&T's done for us. Our committee may not know computer networks, but they sure know

AT&T comes through.”



The AT&T Information Systems Network

AT&T's ISN connects more computer environments, in more ways, with greater transparency than any network available today.

Gateways to other vendors: Async hosts, IBM¹ 3270, ETHERNET² Bridging, XNS² TCP/IP, DECnet³ protocols.

Supported protocols: AT&T STARLAN Network, BSC, SNA/SDLC, HDLC on a fiber optic and twisted-pair backbone.

Speed/ports: 8.64 Mbps backplane, 48,000 pps, 1920 ports, contention management by perfect scheduling.

Local & Remote Management: STARKEEPER[™] NMS.

If your company's plans include strategic use of information in a multi-vendor environment, contact your AT&T Account Executive or call 1 800 247-1212.

From equipment to networking, from computers to communications, AT&T is the right choice.

© STARKEEPER is a trademark of AT&T

1. IBM is a registered trademark of International Business Machines Corp.

2. ETHERNET and XNS are trademarks of Xerox Corp.

3. DEC and DECnet are trademarks of Digital Equipment Corp.

© 1987 AT&T



AT&T
The right choice.

Opinions

SYSTEMS MANAGEMENT

JOHN MOTT

Don't burn BOC bridges

Life is grand for today's telecommunications managers. We have local bypass, a wealth of carriers to choose from, a universe of digital switches, fiber optics for the common man and, best of all, some say, no more reliance on the Bell system. Managers can finally do it all themselves. Or can they? The following facts make it seem so:

- At the Chicago Board of Trade, we don't need the local Bell operating company for processing, loops, moves, adds, changes or any of the traditional plain old telephone services (POTS). Our system is currently configured with two fully integrated voice/data nonblocking processors, distributed electronics, and our own fiber-optic network and skinny cable plants. With our software system, moves, adds and changes can be made in minutes, or overnight, if there is a large amount of work. Quality is assured with a 100% end-to-end digital system.

- We do our own numbering, feature assignments, route guides and record keeping. This gives us total control over our telecommunications system configuration. Because these functions are in-house, we know that project dates and deadlines, once set, can be met. We don't need what remains of the Bell system for routine administration of our telecommunications systems, nor do we need them for planning our projects.

- There are enough competent cable and plant people in the marketplace, so we have no need, ever, to rely on the local BOC or its subsidiaries. Rather than do bulk cable work

ourselves, we contract with reputable firms. Due to the sporadic nature of such work, it makes little sense to have full-time cable people on staff.

- We don't need the local BOC for point-to-point capacity within our own city, and we don't need them for communications paths between our private branch exchange and the other common carrier points of presence. We can purchase systems off a supplier's shelf or buy services from any number of third parties.

- We have planned and designed so well that we will never need help from anyone under any circumstances, least of all from the BOC. We have reels of cable in the frame room, we're religious about daily data backups, all major systems have at least N+1 redundancy and all vendors have critical spares ready to be delivered on a moment's notice. Best of all, we have a continuity of operation plan (COOP) that has been tested and works.

But if all of the above is true, do we need the local BOCs? Yes. Anyone who believes otherwise is reading the data wrong or existing on mushrooms in a parallel universe.

Managers should take the view that the local telephone company is an important friend and business partner and the single most valuable resource available for disaster recovery. It has skilled craftspeople working day and night, performing tasks that an in-house staff might need to do only once every three or four years. The BOCs have been doing these things for generations, and they are the best in the trade.

For example, the Chicago Board of Trade

has had several recent incidents, including a fire that damaged a sizable portion of our plant and torrents of water that turned our distribution frame and hybrid racks into perfect single-conductor grounds. In each case, our in-house staff could have repaired the damage, but it would have taken days or weeks, and then only if each critical supplier had magically and immediately delivered all the pieces and parts needed.

Instead, we called Illinois Bell. Even when called at midnight, it had competent people working with our in-house technical staff within the hour. Together, we repaired the damage before business was affected.

No single private concern has the resources to recover alone from major fires, floods or similar disasters within a time frame acceptable to company management. No matter how large or redundant your system is, there is a point when it will be connected with someone else's system; that connection will almost certainly be made through the BOCs. What of protocols, troubleshooting, signaling, maintenance, alternate routing and other circuit concerns? Remember, you own only one end of the circuit.

How well, how fast and how reliably work gets done on your system will depend on how well you interface with your local BOC. The odds are that an adversarial relationship will not be helpful.

The communications manager and the local BOC are in the telecommunications business together. If both take the view that they are partners in a tough, technical and demanding environment, both will be better off for the effort. ■

Mott is director of telecommunications for the Board of Trade of the city of Chicago.

TARIFFED PRODUCTS AND SERVICES

ANDRES LLANA JR.

Let users in the door

Southwestern Bell Corp. recently announced a proposal to bring together the company's best technical and marketing talent to develop new product lines, thus raising a significant but seldom-answered question — where's the user input? How do users get their requirements into the product planning process?

All too often the telephone companies — including AT&T, MCI Communications Corp., US Sprint Communications Co. and others — pursue an overly paternalistic approach to market needs. They apparently view the customer as less than technically knowledgeable and themselves as the only ones capable of conceptual thinking.

While it is true that some users may lack technical competence, this certainly is not true in all

cases, particularly among communications professionals who support users and make the telephone company products and services work. Quite possibly, the telephone companies may be overlooking a very articulate group, with a body of knowledge that could be quite valuable in the search for new products and services.

To some observers, the telephone companies appear to be afflicted with a "not invented here" syndrome that precludes the infiltration of outside thinking. Consider for the moment the isolation of an in-house product planning group, such as the one Southwestern Bell has established.

What would be the chances of an innovative product or service arising from the planning process of such a group? The birth of any such product would be particularly unlikely if sponsorship did not come from within the group.

Without the possibility of out-

side inspiration, any new concept obviously would have to surface from within the group. In this regard, the resulting sterile planning process could result in stilted products that are narrow in focus and play not to the needs of the user public but to some circumscribed corporate interest.

A good example of such narrow thinking can be seen in the software-defined network offered by one of the major carriers. The product was well-positioned for the marketplace, since it allowed small users to establish virtual networks, making it possible for a wider user audience to take advantage of this new service offering.

However, it is now two years into the product's life cycle, and the carrier still doesn't offer translation for calls to and from locations on and off the network. Hence, a user attempting to call from a network location to an off-network location with an area code

and central office prefix identical to any six-digit network address will be connected with the network address. This is a very elementary shortcoming in what might otherwise be a good product.

One wonders how such a deficiency could slip through the product planning cycle unnoticed. Perhaps the answer lies in the sterile environments that allow products to emerge before they can be refined to a point at which they meet all user requirements.

Thinking is the hardest task; sharing those thoughts with colleagues is the reward. Put them in a column for *Network World's* Opinions pages. Columns should express strong opinions on timely industry issues. Manuscripts must be letter quality, double-spaced and approximately 700 words in length. Disk or modem submissions are preferred.

Contact Steve Moore, features editor, *Network World*, Box 9171, Framingham, Mass., 01701, or call (617) 879-0700, ext. 732.

Llana is director of consulting services for the Vermont Studies Group, Inc. of West Dover, Vt.

Opinions

► TELETOONS — By Phil Frank



There is certainly room in our consumer-oriented economy for poorly planned, throwaway products. Such products have long supported the discount market and similar secondary markets. However, there is no room in the regulated telecommunications market for poorly planned products that fall short of user requirements.

The cost of implementing these unfinished products is an unfair burden on the user. In addition, it is the user, not the provider, that has to bear the long-term cost of an inflexible product that is not designed with user needs in mind.

We have gone well beyond the plain old telephone service stage. Industry and business rely heavily on these services to support a wide variety of business applications. Users should not be saddled with products that fall short of expectations and requirements.

Regulated products and services in the telecommunications industry cannot be relegated to some flea market or low-end discounter if they don't work. Such products should be made correctly in the first place, not used as is until they can be refined and retariffed.

If a telephone company is to expand its offerings and develop responsive products and services, it will have to swallow its corporate pride and include more articulate users in the planning process. And this will have to be supported by more lenient tariff policies on the part of regulatory bodies so the telephone companies will not jeopardize tariff filings by virtue of user participation in the planning process.

Changes such as these will make it possible for the telephone companies to develop products and services that are more responsive to a broader user audience. Isn't it time the focus of product planning in a public utility be aimed at meeting the needs of the public they serve?

Shouldn't the telephone companies become more market-driven rather than develop new products and services in a vacuum?

After all, we no longer see any of the old hand-cranked wall-mounted station sets on the market; telephone company research and development brought us better, more usable products decades ago. Why shouldn't we expect the same of tariffed services? □

EDITORIAL

Check your net worth

Two recent stories in the press — one in *The New York Times* and the other in *Network World* — could have a profound impact on communications managers who plan their networks in sync with their companies' strategic corporate goals.

The *Times* piece describes how, after 15 years of dominance, net profits are increasingly taking a back seat to returns on assets (ROA) when it comes to the way companies measure their financial fettle.

Citing U.S. Department of Commerce statistics, the article states, "For corporate America as a whole, the after-tax return on its factories, machinery and many other holdings fell from an average of 8% in the mid-1960s to about 3.5% in the late 1970s and [the] 1980s." The article goes on to say that the number has now bounced back up to 4.2%.

Despite the rebound, the ROA situation puts pressure on companies not to invest in capital equipment — yet such investments are critical to a communications manager's ability to perform his job. Fortunately, the importance of investing in networks as part of overall corporate strategy has been well-documented, and, in the case of many large companies, commonly accepted.

Sharp-eyed bean counter types who digest these ROA revelations may very well try to turn them against networking investment plans. That would be a mistake, as the article goes on to point out. Using Ford Motor Co. as an example, it describes how that firm has actually reduced factory floor space while investing heavily in automation equipment. The result? Ford's ROA rose from 4.9% in 1979 to 12.1% in the first nine months of 1987.

What this illustrates is the need to invest *selectively* in capital equipment. In Ford's case, it made good financial sense and is paying off in the form of that suddenly old-fashioned measurement — net profits. Net profits may be old-fashioned, but they will always be welcome in the executive suite.

Suppose for a moment, though, that you are suddenly hit with the ROA argument when you propose network investment. The *Network World* article mentioned at the beginning of this disquisition can

then be of some help.

The article ran in the Nov. 30 issue on page 1 under the headline, "Study offers insights into true costs of net ownership." The study in question was funded by Digital Equipment Corp. As our article began, "The cost of network equipment, frequently a major factor in acquisition decisions, actually accounts for less than 25% of total network ownership costs and does not reflect long-term network expenses."

Conducted by the Index Group, Inc. of Boston and Michael Treacy of the Massachusetts Institute of Technology, the study said companies often evaluate networks using the wrong criteria, primarily because network costs are so difficult to track.

Therein lie both dangers and opportunities for communications managers.

The dangers lurk behind the uncertainties. If you can't quantify your current and future costs, you can't expect top management to sign off on expensive network investments.

Interestingly, Treacy said, the study found that none of the 14 Fortune 500 companies it surveyed "had any idea of its total network cost." How many of those companies' communications managers are rapid risers in the corporate hierarchy? We suspect that few are.

The opportunities lie in rolling up your sleeves, digging into your network expenses and understanding them. Then you can go to top management and justify investments by explaining how they will bolster the company's strategic thrust while respecting its bottom line — including ROA.

However, to a certain extent, the study is a double-edged sword. It points out that the bulk of expenses for corporate networks come after the acquisition stage and primarily consist of personnel costs.

So, while you may use it to justify capital investments, you may find it puts you on the defensive when it comes to explaining the size of your staff. Again, though, if you understand your staff and what it does, defending its size shouldn't be a problem.

Here's the message: Stay in tune with your network expenses and your company's business plan. □



Join the suc

Attend the most important 4 days of the

Communication Networks '88

January 25-28
Washington D.C.
Convention Center

The In-depth tutorials offered at Communication Networks '88 are the most comprehensive one-day series in the industry. Make your success a priority in 1988. Register now for the tutorial that will help you most in the year ahead.

In the telecommunications industry, you just can't learn it all on the job. Things are moving too fast — there's too much at stake to risk trial-and-error downtime.

CN '88 is your best educational opportunity of the year. The full-day, university-level tutorials help you bridge the gap between today's exploding technical and managerial possibilities and your ability to get them working for you.

No matter what your level of experience, you'll find the basic or advanced tutorial you need. Led by a top telecom professional, each tutorial gives you knowledge it would take years to learn on your own. You'll get answers to your most pressing questions. You'll discover how colleagues are solving problems similar to yours. Plus, attendance gives you automatic admission to the three-day Expo.

Last year's tutorials were filled to capacity. Don't risk disappointment! Register now!

Start the new year off right! Choose the data/voice/ telecom tutorial now that will profit you the most —

- Introductory, Intermediate & Advanced levels
- Attendees qualify for Continuing Education Units and Certificate

In-depth Tutorials: Monday, Jan. 25

T-1 PLANNING INTEGRATED CORPORATE NETWORKS

Dr. John McQuillan, President, McQuillan Consulting



This intensive, one-day seminar instructs you on planning issues for integrating packet, circuit, and channel switching; SNA and X.25; and voice and data in a corporate network strategy. You will address the role ISDN will play, as well as enterprise-wide networking and bandwidth-intensive applications.

Level: Intermediate.

T-2 MULTIVENDOR/MULTIARCHITECTURE LANS: MAKING THEM WORK

Dr. Kenneth Thurber, President, Architecture Technology



Attend this tutorial for a comprehensive overview of today's LAN environments. Discussion will include how to tie diverse and often incompatible network elements together in a manageable, logical way, as well as alternatives to LANs. Level: Advanced.

T-3 ISDN: STANDARDS, PRODUCTS AND SERVICES

James G. Herman, Independent Consultant, and Mary Johnston, Senior Consultant, Telecommunications Consulting Group at BBN



ISDN is fast approaching. Some say with too little agreement on fundamental standards and applications. Attend this highly focused, intensive session to anticipate the emerging standards, vendor trials, conflicts, successes, products and service offerings that will emerge over the next several years.

Level: Intermediate.

T-4 MULTIVENDOR NETWORK MANAGEMENT

Jerry McDowell, Vice President, Vanguard Telecommunications Inc.



Enroll in this intensive tutorial for skills in how to manage a network which links multiple carriers and a variety of hardware and software vendors in one corporate network. You will learn how to take control into your own hands and avoid finger pointing, acrimony and poor service. Level: Intermediate.

T-5 HOW TO BECOME A BETTER TELECOMMUNICATIONS MANAGER

Gerald P. Ryan, President, Connections Telecommunications Inc.



Today's network manager must not only understand new technologies and standards, but must also play many roles in the company. Attend this instructive tutorial for an entertaining and thought-provoking look at what you need to know to be a successful network manager, plus the tools, processes, and organization that will maximize your efficiency. Level: Intermediate.

T-6 THE LATEST LOOK AT NETWORK STANDARDS AND OSI

Richard desJardins, Director of Technology R&D, Computer Technology Associates Inc.



As OSI and the older standards are reaching maturity, numerous new standards are in the works. Attend this intensive session for a look at the new generation of standards — including their purpose, significance, applications, and technical elements. Level: Introductory.

T-7 MODELING AND DESIGNING DATA AND INTEGRATED NETWORKS

Dr. Wushow Chou, Professor of Computer Science and Electrical and Computer Engineering, North Carolina State University



Enroll in this tutorial for detailed instructions on how to design integrated networks. You'll learn about combining voice and data on a single architecture to maximize the efficiencies of wideband services, the migration from classical multipoint to distributed systems, plus cost-efficiency issues and other practical considerations. Level: Advanced.

T-8 IBM NETVIEW: INDUSTRY WIDE IMPLICATIONS

Atul Kapoor, Vice President, Kaptronix Inc.



This tutorial gives you a thorough and comprehensive introduction to IBM's NetView and NetView/PC — their operation, technical specs, dependencies and functional interactions, plus an analysis of their impact on the industry, significance for users, and practical suggestions for implementation.

Level: Intermediate.

T-9 OPEN NETWORK ARCHITECTURE: CARRIER/VENDOR/USER IMPLICATIONS

Haines Gaffner, President, LINK Resources Corp.



The FCC has ordered AT&T and the RBOCs to adopt ONA to stimulate competition in enhanced data processing services over public switched networks. Enroll in this tutorial to learn the details of the ruling, its implications for service offerings and an overview of who the players will be.

Level: Intermediate.

T-10 INTERNATIONAL NETWORKS: SOLVING THE PRACTICAL PROBLEMS

Len Elfenbein, President, Lynx Technologies Inc.



Attend this tutorial if your company is expanding its network outside the U.S. You'll receive immediately useful information on tariffs, rules, how to handle ordering and service delays, the role of the PTTs, how to deal with the lack of consistency from country to country, and many more issues you must confront to succeed. Level: Intermediate.

Success network!

year for telecommunications professionals

T-11 BUILDING THE NETWORK CONTROL CENTER

Gabe Kasperek, President, Kazcom Inc.



This one-day course will help you successfully operate a network control center on a day-to-day level. You will focus on the practical requirements, functions to be performed, systems and tools available and how to put them all together to gain control over your network. **Level:** Introductory.

T-12 REGULATORY ISSUES AND ANSWERS

Richard E. Wiley, Senior Partner, Wiley, Rein & Fielding



Take this comprehensive seminar to make sense of the increasingly complex regulatory environment. You will receive a thorough briefing on the legal, social, and regulatory issues, the evolution of vendor technology and industry standards, and significant developments affecting the coming regulatory year. **Level:** Intermediate.

T-13 INTRODUCTION TO DATA COMMUNICATIONS

Gary Audin, President, Delphi Inc.



This perennially popular tutorial provides exactly the right mix of concept, technology, and application for the beginner to get a good foundation in data communications. The course notes are excellent reference material and the instructor is one of the most highly regarded professionals in the industry. **Level:** Introductory.

T-14 INTRODUCTION TO VOICE COMMUNICATIONS AND PBX

James Morgan, Principal, J.H. Morgan Consultants



Enroll in this full-day tutorial for a comprehensive foundation in the basics of voice communications — technology, PBX characteristics, switched networks, tariffs and services, as well as an overview of traffic engineering. **Level:** Introductory.

T-15 IMPACT OF THE NEW POST-DIVESTITURE TARIFFS ON LARGE NETWORKS

Robert L. Ellis, President, The Aries Group



In this intensive tutorial you will learn the structure of the post-divestiture tariffs, the latest January 1988 changes to these tariffs, how to price interstate private lines, how to configure and price interstate FX services, the new economics in configuring data networks, the LATA-pure strategy and federal access tariffs and how to use them. **Level:** Intermediate.

For immediate information call 1-800-225-4698

Conference and Expo: Tuesday-Thursday, Jan. 26-28

Your Network for Success

This year's Communication Networks will be the biggest, most important voice/data telecommunications show ever. In an exciting atmosphere of new product introductions, late-breaking news, exhibits, demonstrations and intensive knowledge sharing, you'll get the

latest word on all aspects of voice, data, and telecommunications equipment, services, software and management solutions. Over 17,000 telecom professionals are expected to attend. Be there for the most important week you may spend all year!

10 Conference Clusters

Meet the industry elite at over 75 conference sessions organized into 10 clusters covering today's hottest topics. Drawn from requests made by previous attendees, these tracks let you customize your focus on aspects of the industry that you need to know now.

- Washington Regulatory Scene
- New Product Review

- Network Planning & Design
- Network Operations & Management
- Voice Networking Issues
- International Issues
- Technology Briefing
- Professional Management & Development for Telecom Managers
- Standards & Connectivity
- Pros and Cons

300+ Top Vendors

Between sessions, find practical solutions to your problems at over 1,300 exhibit booths from more than 300 of today's top telecom vendors. Be one of the first to evaluate newly-released products, technologies, and services.

Find out more about established products. Attend demonstrations. Ask tough questions in face-to-face meetings with vendors' representatives. Make price/performance comparisons that help you make smart buying decisions.

Early Bird Sessions

If you're an early riser and want an introduction to the conferences held later in the day, get a head start with the Early Bird Session of your choice.

Tuesday:

- "Network Design"
- "Introduction to Data Communications"
- "Introduction to T1"

Wednesday:

- "Introduction to SNA"
- "Introduction to Network Diagnostics and Control"
- "Introduction to Voice Communications"

Thursday:

- "Traffic Engineering"
- "Fiber Optics"

Register now. Complete this Enrollment Form and mail it today!

Choose one and indicate tutorial number:

- ☐ All four days at CN '88, including one In-depth Tutorial (Jan. 25) indicated below and full admission to the three-day Conference and Expo (Jan. 26-28) including seminars and exhibits.
In-depth Tutorial No. T-_____ \$695.00
- ☐ The three-day Conference and Expo (Jan. 26-28)..... \$495.00
- ☐ The all-day In-depth Tutorial (Jan. 25) indicated below, including admission to exhibits (Jan. 26-28).
In-depth Tutorial No. T-_____ \$295.00
- ☐ One day at CN '88, including admission to the Conference and Expo. Reserve space for me on:
Tues. Wed. Thurs. \$195.00
Circle one
- ☐ Please send me more information on Communication Networks

Card No. _____

Expiration Date _____

Signature _____

☐ Check enclosed ☐ Bill me

☐ Bill company P.O. # _____

☐ American Express ☐ MasterCard ☐ VISA

Name _____

Title _____

Company _____

Street _____

City _____ State _____ Zip _____

Telephone () _____ Ext _____

Note: All prices include lunch.

NWWD

Return Registration Form to: CN '88, P.O. Box 9171, Framingham, MA 01701-9171. Or call TOLL FREE 800-225-4698

Special Section: LAN management

NETWORK WORLD

Features

December 14, 1987

Managing LAN security

Securing
LANs and
pleasing users
means keeping
a lot of balls
in the air.

BY MICHAEL HURWICZ
Special to Network World

The local-area network security problem can't be solved with technology alone; it involves many purely human factors. Consider, for example, the most widespread local network security devices: the user identification and password. If people always followed rules, users would change their passwords regularly and never reveal them to others. Unauthorized users would have to go to great lengths to obtain a password.

In reality, many users carelessly reveal their passwords and change them as seldom as possible. Some even arrange to have their passwords disabled so they can log on without using one. The reason, according to Rand Hein, a vice-president in the Advanced Systems and Technology Department of Security Pacific Automation Co. in Los

Hurwicz is a freelance writer based in Nashville.

Angeles, is that users are more concerned with getting their jobs done than with following proper security procedures.

"Security is not usually a 'graded item' and is viewed as overhead by virtually everyone," agrees John O'Leary of O'Leary Associates, a Plano, Texas-based consultancy specializing in security and operations-related issues.

Given such circumstances, can microcomputer local-area networks really be secured? "LANs are securable," says Frank Smith III, director of information security services with Ernst & Whinney, a Cleveland-based consulting firm. But putting a board or some software in a personal computer is only a partial solution, he adds.

The other part is management action to make sure the technology is used correctly.

The first such action, according to O'Leary, is formulating a company policy espousing the protection of data and citing the responsibility of all users in this area. Such a policy says, in effect, "This company thinks security is an integral part of good data management. Thus, proper security practices are a condition of employment here." Such a generalized policy statement paves the way for a series of detailed policies or standards.

Next, sensitive information must be restricted, or classified, so that users know to which types of information the policy applies. However, says O'Leary, *most* data should be unclassified. "Overclassification cheapens the value of classifying things," he says. "If everything is classified, nothing receives special treatment."

Items that may require classification include next year's market-

Continued on page 36



s e b e r t

From page 34

ing strategy, mailing lists or customer lists, new product plans and other items that usually fall under the trade secret umbrella.

Companies typically establish three or four gradations of sensitivity, with the highest being "registered confidential," meaning that only a specific list of registered users may access the information.

Both O'Leary and Smith agree that gaining users' acceptance of the corporate information security policy is a key issue. Some companies even ask users to sign an agreement promising to protect certain types of information, O'Leary points out. That lends weight to the policy and elicits commitment from users, who see themselves as responsible for the security of the information they use.

It's important to explain to users why a particular control is in place. "We have found that once the control is accepted by the user community, it is no longer considered cumbersome," Smith says. For example, passwords were considered onerous at first but are now widely accepted.

On the other hand, Smith adds, if users don't accept controls, the manager must "be in a position to prevent unilateral circumvention of controls by users. If the owner of the information has determined that it has a certain degree of sensitivity, then the user must accept those controls in order to be authorized to use the information."

Managers in charge of local-area networks often emphasize the necessity of being able to prevent access to information if necessary. Hein says, "You have to assume the worst. Otherwise, you don't have real security."

However, education is not always effective. And assuming the worst by burying users in security measures doesn't always work, either.

Greg Scott, who manages a 185-workstation NetWare local network in the College of Business at Oregon State University in Corvallis, Ore., says that, given his role as network manager, there are limits to his ability to use either educational or technical security measures. Yet, security is important, since exams and faculty correspondence are on the network, which is also used by about 1,500 students each semester.

As an example of the problems Scott faces, he says some faculty members continue to employ their user IDs as passwords, a dangerous practice since user IDs aren't too difficult to discover. Scott says he doubts that efforts at education could change this practice. He also

hesitates to activate the NetWare 2.1 feature that would force users to change passwords periodically and use a different password at each change. "I serve at the pleasure of the faculty. They are a very independent group," Scott says. "It is difficult for me to dictate rules and policy to them."

The College of Business wants to encourage faculty members to use the network as much as possible, Scott says. "The faculty needs to become proficient with this technology, which is becoming more and more important in the business world. If you make the security system too onerous, you inhibit the use of the network."

The desire to encourage network use is not unique to the university environment. "Management wants utilization of that LAN," O'Leary says. "They want it humming, in use all the time. PCs and LANs are installed to increase productivity. Security controls that significantly decrease productivity are not going to be tolerated."

Thus, the ideal security system would be easy to use while being nearly impossible to circumvent. No product lives up to that description entirely, though some steps are being taken in that direction, O'Leary says.

Various technologies can restrict user access, prevent system break-ins and manage system security ("Diverse nets are high-risk groups," *NW*, Aug. 24). Some of the most common technological solutions are one-time passwords, challenge and response systems, call-back systems, encryption and shielding of hardware. One-time password systems address the tendency to reveal or disable passwords. Such a system has two main components: a small calculator-like password generator device and the host software. The host software knows, through one of two typical methods, which password a particular genera-

tor should produce at any given time, and thus it is able to determine if the logon is legitimate. In the simplest scenario, the user types in the password and a personal identification number (PIN), which the host software validates. The Access Control Encryption system from Security Dynamics of Boston works in this manner.

A potential weakness of such a system is that a perpetrator tapping into the local-area network transmission line could discover a PIN. Even if the transmission is encrypted, the perpetrator could record the encrypted PIN digitally and play it back later. Then, by stealing a password generator, the perpetrator might be able to gain access to the host.

A challenge and response system overcomes this weakness. The host software displays a challenge number on the user's screen. The user enters this number and the correct PIN into the password generator. The password generator then supplies the password. The PIN is never sent over the network. Thus, it can never be discovered by listening in on the network.

To break a challenge and response system, a perpetrator has to steal a password generator and learn the associated PIN. This is more difficult than just discovering a password. Furthermore, while there is often no way for users to know that someone has stolen their passwords, the absence of a password generator is likely to be noticed rather quickly, since users cannot log on without one.

Local networks are particularly vulnerable to intrusion if users can access them by dialing up over the telephone. Software is readily available that allows any personal computer with a modem effectively to become a part of the local network.

That means that, when someone logs on, the network manager may not be able to determine where that person is physically located.

"Those issues must be considered by management when deciding what kinds of communications to permit," Smith says.

Local networks that permit dial-up access can attain a reasonable degree of protection through the use of dial-back equipment. After a remote user calls into the local net and obtains a user ID and password, the dial-back equipment hangs up and calls the user back at a prearranged number.

The existence of transfer features on many phones weakens this form of security somewhat. The dial-back equipment could call a number in San Francisco, but the call could be forwarded to a computer at another number in New York. The number called is no longer a definite clue to the location of the remote computer.

Coding and cable protection

A sophisticated perpetrator may use a network analyzer to monitor activity on a network and record transmissions. One defense against this is encrypting, or encoding, network transmissions so that they are incomprehensible until they

are decrypted.

Encryption can be accomplished through software or hardware. Software-based encryption may slow down applications, especially if it is based on the decade-old Data Encryption Standard (DES). Hardware-based encryption, on the other hand, is usually expensive. For these reasons, perhaps, encryption is not popular on local-area networks.

In addition, in 1986, the National Security Agency (NSA) stopped certifying equipment for compatibility with DES. However, it has not published a new standard. This fact may have placed a further damper on encryption ("Death of a standard," *NW*, Aug. 17).

Successfully tapping into fiber-optic transmission media is beyond all but the most determined and sophisticated of villains. It requires special machinery and a high degree of skill. Thus, fiber optics are currently a more secure medium than those that rely on electrical signals.

Even on local networks that use fiber-optic transmission media, the servers and workstations use electrical signals internally. Radio frequency radiations emanating from these machines can be picked up at a distance, recorded and interpreted using inexpensive equipment.

In order to prevent this, boxes must be shielded to reduce electromagnetic radiation. The NSA defines a Transient Electromagnetic Pulse Emanations Standard (TEMPEST) that specifies government requirements for such protection. Most government computer systems must conform to TEMPEST.

Most local net operating systems support passwords. However, some, such as IBM's PC LAN Program, associate passwords with devices or directories rather than with users. In order to have effective security under such a system, each user must use a number of different passwords. When users find it difficult to remember these passwords, they often write them down, thus compromising the security system.

On the other hand, if all devices share a small number of passwords, many people typically know these passwords. This makes a leak of any given password much more likely, and each password

Continued on page 40



Some of the most common technological solutions are challenge and response systems, encryption and shielding of hardware.

Special Section: LAN management

What's the right tool for the job?

Continued from page 1

Local-area networks can link workstations in a distributed processing environment, dumb asynchronous terminals running off multiple hosts or hosts transferring files among themselves, to name just a few applications. In

each of these environments, a local network can be configured in various network topologies, using a wide selection of transmission media. This diversity requires tools that can monitor and control various transmission media, link-level protocols and higher layer protocols.

Regardless of topology or protocols used, all local networks have similar re-

quirements for effective management and control. Common functions include performance management, problem management and network administration. While alternatives in local net standards

Continued on next page

Juggling network management tasks is a tough act without some sophisticated help.

Chartoff is a group manager with Network Strategies, Inc., a telecommunications consulting firm in Fairfax, Va.



From previous page
(IEEE 802.3, 802.4 and 802.5) have created multivendor implementations that complicate the issue of network management, these same standards also provide common sets of protocols to be monitored.

For example, a baseband coaxial cable local-area network using Ethernet interfaces from different

joined with repeaters. Because bridges and gateways filter locally directed traffic to a local network address only, the network analyzer cannot monitor frames beyond the bridge or gateway.

However, analyzers that can decode higher layer protocols can analyze higher layer protocol traffic passing through the bridge or gate-

physical interface and machine access control layer protocols. However, analyzers for multiple local network standards can be combined in a single unit.

For example, Network General's The Sniffer can support both Ethernet and Token-Ring interfaces, and the TMA802 Media Analyzer from Tektronix can support all three IEEE 802 local-area network standards.

For broadband networks, AM Communications, Inc. provides a network analyzer called the LANguard Technical Monitor and Control (TMC) System. TMC-8000 monitoring units are located at the head end, at amplifier locations and on drop cables. LANguard provides signal-level measurements and a spectrum analysis to assist in troubleshooting broadband networks. The Token/Scope Network Analyzer from Concord Data Systems, Inc. provides monitoring of IEEE 802.4 Token Bus networks.

Network managers

Network managers provide network administration functions. They can actively control other network nodes through changes in configuration, such as disabling a node.

Net managers are used with ven-

terminal ports such as connection addresses, session duration and connection traffic in addition to information on network nodes.

Also included in the local network manager category are centralized, host-based network management products. IBM's NetView can monitor one or more Token-Ring Networks through the NetView/PC product. NetView/PC treats the Token-Ring like any other non-Systems Network Architecture network. It receives network management data from the Token-Ring Network Manager and presents the information to NetView for display.

DEC's Network Management Control Center/VAX Ethernim local network tool provides centralized network management for DECnet networks. The Ethernim program maintains a data base of local-area network nodes and graphically displays current network status. Ethernim also performs path testing to determine network connectivity.

The right job for the right tool

Within the broad areas of network management, administration and monitoring, there are several tasks that local net tools must be able to perform. Among the most significant are:

■ **Load management.** Local network performance management is important for planning system capacity. Once a network is in place, it is usually very easy to add additional nodes or terminals. As traffic loads increase, user response times increase. Traffic load also varies by time, with peaks occurring at various times of the day. Tools are needed to measure such parameters as the total amount of packets sent and received by each node and for the total network; round-trip delay associated with transferring data; percentage of network capacity being utilized; aggregate bit rate; and frame and packet size. These measurements should show traffic variations over time.

■ **Data link interpretation.** To collect traffic statistics for capacity planning, a local network tool must interpret a data link layer protocol

If possible, users should try to combine networks and management tools from one single vendor. First, however, it is necessary to understand the tools and how they can be used.

vendors can be monitored by a single Ethernet network analyzer, although actual control of the interfaces is vendor-specific.

The need for network management standards has been recognized by organizations such as the International Standards Organization, the Consultative Committee on International Telephony and Telegraphy and the Institute of Electrical and Electronics Engineers.

Eventually, the development of these standards will result in common vendor implementations of such network control functions.

Until then, users should find the products that meet current net management needs. If possible, they should try to combine networks and management tools from one single vendor. First, however, it is necessary to understand the tools and how they can be used.

The manager's toolbox

Local net management tools are typically based on IBM Personal Computer XT's or AT's or on specialized processors that attach to the local network as a network node.

Local net tools can be grouped into two major categories: network monitors, or analyzers, and network managers. Both can be used for network problem management.

Network analyzers

Network analyzers measure performance management by passively monitoring activity on the local network, collecting statistics and producing bar graph displays that aid troubleshooting and capacity planning. While some network analyzers can simulate traffic loads by sending packets out onto the network from one node, this activity does not directly affect the operation of other network nodes, and no traffic is sent specifically to any other node. This traffic simulation does, however, affect the ability of other nodes to send any traffic into the network, thus decreasing net throughput during the analysis.

Analyzers are typically used to monitor an individual local network segment or multiple segments

way to or from the networks. For example, a network analyzer that can decode Transmission Control Protocol/Internet Protocol addresses can identify the source network of a packet that passes through a bridge to a destination node on the same local net segment as the analyzer.

Analyzers can also be used in

Net managers are used with vendor-proprietary local-area networks and terminal server networks. Examples include Bridge's Network Control Server/AT and Sytek's System 5101 Network Control Center.

protocol development environments, since packets are easily inspected for proper protocol handling. Custom protocols can be monitored, since the analyzers can simply display packets in hexadecimal or ASCII in addition to decoding them according to a standard protocol format.

Network analyzers are primarily available for the two leading local-area network standards — Ethernet and IBM's Token-Ring Network. These vendor-independent devices can monitor any local-area network conforming to the appropriate standard.

Included among the Ethernet network analyzers are Communication Machinery Corp.'s DRN-1700 LanScan Ethernet Monitor, Digital Equipment Corp.'s LAN Traffic Monitor, Excelan, Inc.'s LANalyzer EX 5000E, FTP Software, Inc.'s LANWatch, Hewlett-Packard Co.'s HP4971S, Network General Corp.'s The Sniffer and Tektronix, Inc.'s TMA802 Media Analyzer. Included among the Token-Ring Network analyzers are the IBM Token-Ring Network Manager, Network General's The Sniffer and Tektronix's TMA802.

Distinct analyzers are required for each local-area net standard because of the unique frame formats,

vendor-proprietary local-area networks and terminal server networks. Examples include Bridge Communications, Inc.'s Network Control Server/AT, Sytek, Inc.'s System 5101 Network Control Center and Ungermann-Bass, Inc.'s Network Control Console. These vendor-specific managers perform many of the same functions as the

DEC's Network Management Control Center/VAX Ethernim program provides centralized network management for DECnet networks and performs path testing to determine network connectivity.

network analyzers.

For example, broadband-monitoring capability is typically built into broadband local network managers. However, they also provide configuration management and access control functions for their terminal servers or network interface units (NIU). Network managers also collect statistics on individual

such as IEEE 802.3, 802.4 or 802.5 in addition to interfacing physically with the network transmission media. For example, a Token-Ring local net analyzer must provide a shielded twisted-pair interface, detect valid Token-Ring frames and decode network address information to allocate frames to a particular node.

Continued on page 40

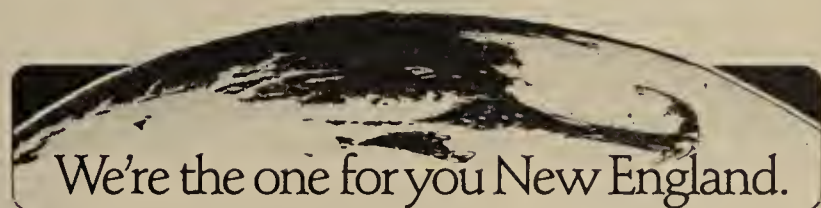
If your telecommunications system lacks flexibility, you have no CLAS.

Now you can have CLAS (Centrex Line Administration System), the service that gives you incredible flexibility and complete control over your Centrex system. CLAS lets you make station feature changes, access database information and obtain management information reports, without the inconvenience of service orders. It's telecommunications service done your way, when you want it, with the freedom and security of a New England Telephone maintained communications system.

A Centrex system with CLAS saves time, minimizes error potential and eliminates some service order charges.

Day-to-day changes and large reorganizations are equally easy to handle. CLAS gives you the power to: • Move personnel without changing telephone numbers. • Activate or de-activate features such as call pick-up and call forwarding. • Access and print-out database information such as directory listings and line changes.

If you're losing touch with your telecommunications system, maybe what you need is a touch of CLAS. For more information about Centrex CLAS, call us at 1 800 343-4343, ext. 89.



New England Telephone

A **NYNEX** Company

Call New England Telephone or one of our authorized sales agents:

**AIM Telephones
of New England, Inc.**
1 800 CALL AIM

Computer Telephone Corporation
within MA 1 800 462-0023
outside MA 1 800 225-3288

**Executone Companies
of New England**
1 800 428-2212

**NYNEX Business
Information Systems, Inc.**
1 800 346-9X9X

TEL PLUS New England, Inc.
within MA 1 800 972-8200
outside MA 1 800 992-2090

Twin State CCS
1 800 833-8000

What's the right tool for the job?

continued from page 38

lar station's traffic count.

■ **Load generation.** To help predict the impact on network performance before new users are added, local-area network tools should include a network load generator. The load generator simulates future sources of traffic by transmitting packets based on a user profile. In this manner, effects on network performance can be observed. If the expected additional traffic load is too much to be supported on the current local network segment, a bridge can be used to segregate the traffic.

■ **Problem management.** Problem management for a local-area network includes becoming aware of service outages and performance degradations through alarms; identifying the source of the problem; and notifying the user of the repair and return of service. Problem management also entails routine monitoring and preventive maintenance needed to establish performance benchmarks and identify potential problem areas before they affect end users. Local-area net tools are needed to measure pa-

As yet, no IEEE draft standard exists for local net management protocols.

rameters such as packets with errors, percentage of errors by type, retransmissions, Ethernet collisions, misaligned frames, illegal size frames and cyclical redundancy check errors. Local net tools should also detect opens and shorts in the network cable.

■ **Broadband problems.** Broadband networks present special problem management requirements. A broadband network typically spans greater distances than baseband networks, traversing both indoor and outdoor environments. Active components such as the head-end and trunk amplifiers must be monitored at several frequencies because of the broadband cable's ability to support multiple networks. Measuring signal amplitude at various frequencies of the typical broadband cable bandwidth of 300 MHz to 400 MHz can give a general indication of the system's health. The IEEE 802.4 Token Bus standard specifies frequencies that are required with this protocol, typically used in a Manufacturing Automation Protocol factory floor network.

In addition to monitoring specific physical layer and data link layer protocols in problem determination, it is helpful to decode the higher layer protocols. However, where multiple protocol suites coexist on the same local network,

the local network tool must decode several higher layer protocols such as Xerox Corp.'s Xerox Network System, TCP/IP or DEC's DECnet. Monitoring the higher layers allows individual user sessions to be tracked, thereby aiding the diagnosis. For example, users can enter particular data streams at their workstations, and the local-area network monitor can detect the traffic actually placed on the network. Excessive protocol overhead can also be detected by monitoring the higher layers.

■ **Network administration.** Network administration for a local-area network includes configuration management and access control. Performance and problem management apply to local-area net nodes in general, but network administration functions are typically required for specific types of end systems, such as terminal servers or NIUs that support asynchronous or synchronous terminal communications across the network.

For example, network management servers store NIU configuration information, including individual port parameters. NIUs request an initial program load (IPL) on the power-up or reset of the unit. The configuration file and program software are downloaded across the local network. The IPL sequence involves vendor proprietary protocols and, therefore, a separate network management server is required for each set of vendor products sharing a local network cable.

■ **Access control.** Access control is also based on vendor proprietary protocols. A validation server, on the same or different node than the network management server, requires a user to enter a valid identification and password. The validation server determines whether the user should be permitted access to a particular network resource. Statistics are maintained on valid and invalid attempts to access protected network resources.

Future directions

Almost all local net tools available today are stand-alone units with vendor-specific implementations.

The future direction of local-area net management tools should be toward products that provide global views of multisite local networks, integrating data from multivendor network analyzers and network managers. Work is in progress on IEEE specification 802.1, which defines the overall architecture for local networks and local network protocol sets and management protocols. As yet, no IEEE draft standard exists for local-area network management protocols. The ISO has defined some services for general network management architecture under the OSI reference model; no specific local net management protocols have been drafted.

The further development of OSI and IEEE standards in the area of network management will make this desired integration appear sooner. □

Managing LAN security

continued from page 36

will give a perpetrator access to a wide range of devices or directories.

The alternative — the one used by Novell, Inc.'s NetWare, 3Com Corp.'s 3+ and Banyan Systems, Inc.'s Virtual Networking Software (VINES) — is to have a single password for each user. The system administrator defines which devices and directories the user can access. When the user logs on, the system makes all those resources available to the user after the user provides the user ID and password. Still, by discovering one user ID and one password, a perpetrator gets access to all the devices and directories accessible to that user.

There are typically limits on what each user can do with files in a given directory. This provides an added measure of protection. Operating systems differ in the flexibility they offer in assigning various kinds of rights. For example, an operating system may not allow the network manager to grant create rights without granting delete rights, even though that might be highly desirable.

Some network operating systems make it harder to discover passwords, or they make sure the password is changed on a regular basis.

For example, NetWare Version 2.1 (available this year) and VINES Version 3.0 (available in the first quarter of 1988) both offer options such as password encryption, limits on the number of consecutive failed logons permitted, user ID expiration dates, time-and-date and physical location restrictions on logons, passwords that can be changed only by supervisors, limits on how many different workstations the same user can be logged onto at one time, audit trails and various types of password

VINES 3.0 foils perpetrators who record and replay all network activity from a particular workstation.

management (length requirements, password expiration and forced password changes).

NetWare 2.1 can also perform half-hour security checks and clear connections found to be invalid. It can also require unique passwords at each change. VINES 3.0 has an additional feature that foils perpetrators who record and replay all network activity from a particular workstation. When an authorized user logs on, VINES creates a "ticket" that is checked at different

times when the user accesses a resource. Stamped on that "ticket" is the time and date of logon. When the perpetrator replays the user's activity, VINES sees that the time or date on the "ticket" is wrong and locks the perpetrator out.

Many of these features have been offered on minicomputers and mainframes by such programs as IBM's RACF, Uccel Corp.'s ACF2 and Computer Associates International, Inc.'s Top Secret, but it is only recently that major microcom-

Security on multiple interconnected local nets is more complex than security on a single local net.

puter local net operating systems have incorporated them.

Oregon State's Scott, who is beta-testing NetWare 2.1, uses these new features in a number of ways. For example, using time-restricted logons, Scott suspends student logons when the student computer laboratory is closed. He also assigns expiration dates to accounts, so that user IDs and passwords become invalid when their owners stop using the computer laboratory.

In addition, by using location restrictions on logons, only five machines are allowed to access the central pool of exams on a regular basis. If someone tries to access that directory from another machine, the attempt will be rejected.

Consistent with the university's policy of encouraging network use, none of these features has any effect on legitimate network users. Only a user attempting an illegal access would ever be aware of them.

Multiple connected networks

Security on multiple interconnected local networks is more complex than security on a single local network. How this complexity manifests itself depends on the network operating system. Under NetWare, for example, users log on or attach to each server separately. Security information for a server always resides at that server.

If one user accesses multiple servers, logon security for that user must be set up separately for each server and within each server for each device or directory. If a device or directory is moved, security must be set up again.

Under VINES, on the other hand, users log on to the whole network just once. Beyond that, security is set up for each device and directory, independent of where the resource is located. Security information does not necessarily reside at the server. If the resource

Continued on page 44

► **RADIO TRANSMISSIONS**

Data's greatest hits

Radio modems broadcast users' data over the airwaves.

BY STEVEN BEEFERMAN
Special to Network World

An increasing demand for data communications among a widening variety of users has created a growing need for new and better transmission media. One area of increasing concern for communications managers is the use of leased or dedicated lines for thin route data, which is data typically broadcast over a single channel at 1,200 to 9.6K bit/sec for distances of up to 30 miles. The high cost and questionable consistency and reliability of such circuits are causing communications managers to seek a way to bypass them.

In cases where the number of channels between points is small or where the points are spread out, the choice has usually been limited to direct or multi-dropped leased lines. Packet-switched networks have absorbed some of this requirement, but when the points of com-

Beeferman is vice-president of marketing for Dataradio Corp. in Atlanta.

munications are in remote areas and away from packet-switched system nodes, the benefits of such systems are usually minimal.

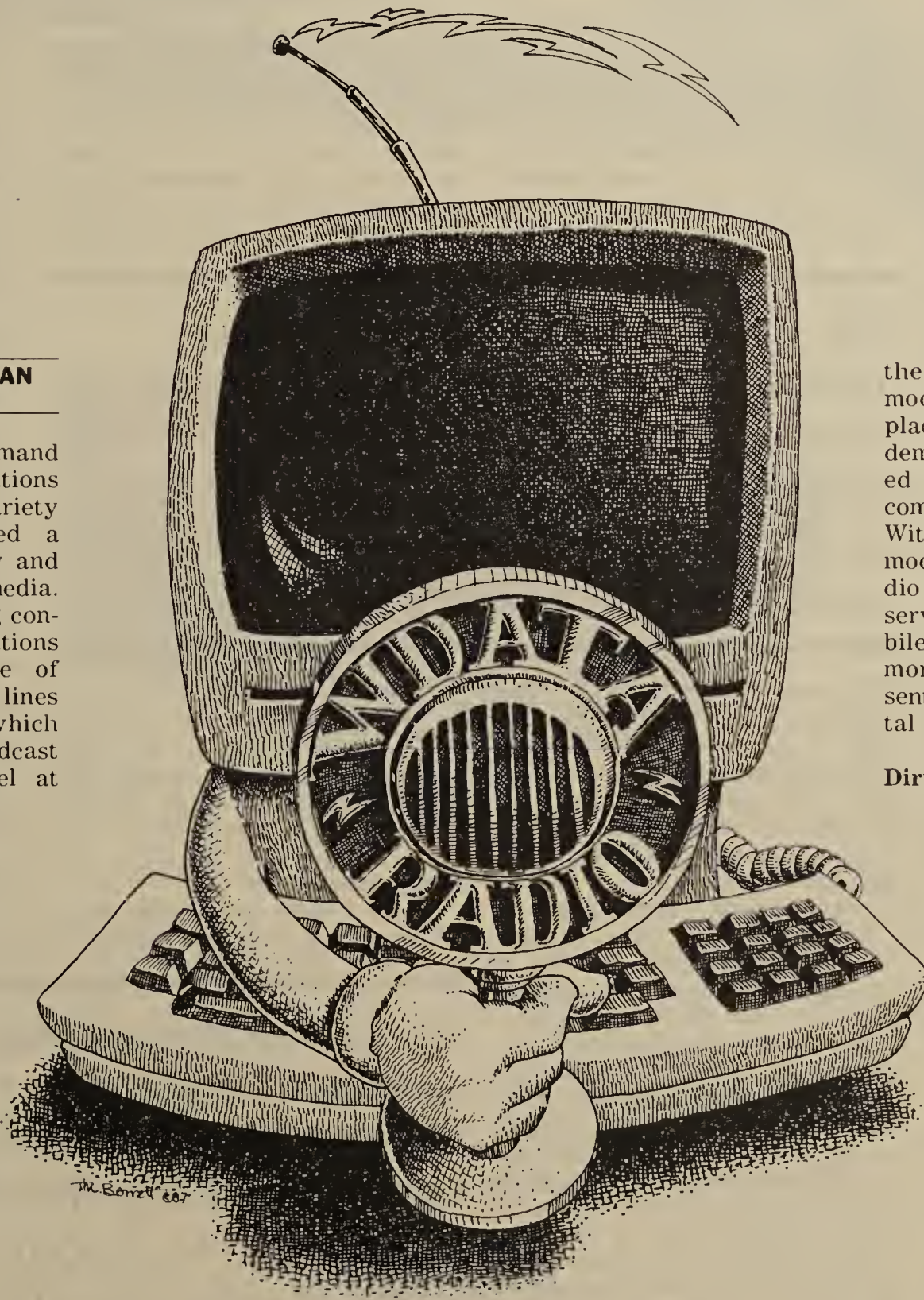
Radio modems are one solution. As

the name suggests, these modems use radio to replace conventional line modems and leased or dedicated line circuits between communicating points. With the advent of radio modems, VHF/UHF FM radio systems, which have served effectively for mobile communications for more than 40 years, represent a new medium for digital data networks.

Dirty broadcasts

Transmission of "bursty" (infrequent short blocks of information) thin route data by radio is not new. Radio has been used for years by the petroleum industry, gas and electric utilities and other organizations to send data from remote points to a central location where no phone lines exist or where the cost of these lines is prohibitive for the nature of the data being sent. For many years, the state-of-the-art procedure for radio applications had been to connect a telephone-type modem to a mobile radio. This simple combination worked, provided the data

Continued on next page



From previous page
needs were modest and the system was designed to cope with the radio environment.

However, radio is a harsh environment for data. Fading, noise, distortion and interference aren't compatible with data transmission. A momentary noise burst, which is a minor annoyance during spoken

Radio is a harsh environment for data. Fading, noise, distortion and interference aren't compatible with data transmission. A momentary noise burst will either alter or destroy a data stream.

communications, will either alter or destroy a data stream. Limitations on speed of transmission and bit error rate are also drawbacks.

The net result was that transmissions were limited to 300 bit/sec, and errors were controlled by retransmitting. Also, unless some system logic was employed, only limited sharing of the radio channel was possible. This resulted in the common use of simple polling-system approaches. If the overall requirement called for more than this, something better was needed; namely, modems and radio systems specifically designed for radio data transmission.

Radio protocols

Radio modems have been developed for the two basic data protocols now in common use in data communications: asynchronous and synchronous. The radio transceiver incorporated into these radio modems has the special qualities necessary to support data transmission at speeds up to 9.6K bit/sec.

First, because the available bandwidth of data-type radios doesn't require the use of filters and special circuits, it isn't as technologically restricted as voice transmission. Second, since most communications are bidirectional, the radio transmitter must be turned on and off rapidly in short intervals to accommodate brief data transmissions, particularly where half-duplex communications is involved. The receiver must be able to go from a muted state to full-receive sensitivity rapidly if the radio link is to support a high rate of data transfer.

■ **Asynchronous.** For asynchronous data transmission applications, data is accepted by the radio modem via an RS-232 interface, much the same as in conventional line modems. The data is grouped into blocks and sent a block at a time over the radio channel. Each block is appended with addressing information and an error-detection algorithm as well as a serial number to control duplicate transmissions. Each transmission is then acknowledged by a brief answering transmission, which contains

similar addressing, error detection and serial number information.

A specially developed transmission protocol for channels between radio modems called Radio Carrier Sensed Multiple Access provides for management of the radio channel, particularly when multiple stations share a common radio circuit. Each station in a network

senses the channel and, if the channel is free, initiates transmission.

If the channel is busy, up to 30K bytes of data may be buffered in the radio modem until the channel clears before transmission is initiated. Should two or more stations try to initiate communications and a collision occurs, no acknowledg-

The operation of asynchronous packet radio modems is controlled by built-in firmware, which enables the modem to be configured as an X.3 packet assembler/disassembler with standard X.28 commands.

ment will be received. In this event, each radio modem trying to send its data will insert a brief pseudo-random delay; in other words, the station with the shortest delay will access the channel first and the other stations will be reassigned a new delay so there's orderly access to the channel.

While this may seem to slow down the transmission process, it actually improves the throughput efficiency over that of an unmanaged channel. For example, if an application requires transactions at a rate of one 80-character message every six seconds (10 per minute), a 4.8K bit/sec asynchronous packet radio network will support 50 such terminals with a response time of .6 seconds or less.

The operation of asynchronous packet radio modems is controlled by built-in firmware, which enables the modem to be configured as an X.3 packet assembler/disassembler with standard X.28 commands. This enables the modem to be easily profiled and field-interfaced to virtually any host computer or data terminal equipment. Additionally, features such as flow control and data rate conversion between the radio network and the terminal and host equipment are provided to make the network

transparent and similar to the line network it is replacing.

■ **Synchronous.** Synchronous radio modems essentially replace the entire modem and telephone line in all applications using standard synchronous protocols, such as IBM 3270 Binary Synchronous Communications, Synchronous Data Link Control, Systems Network Architecture and X.25. They also present a transparent path to the data stream. For synchronous data systems, which typically use polling protocols such as 3270 BSC, the transmissions include clock and data as well as most of the system intelligence needed to operate the multipoint network.

Essentially, synchronous protocols communicate from the host to terminal equipment in the form of brief messages. Each is a communication, whether there's a request for data from a specific terminal or data to be sent to a specific terminal. Radio modems broadcast these protocols over the radio channel and convey addressing information, an error detection code (usually Cyclic Redundancy Check-16) and clock to all terminals. Messages are sent out in sequence, and only the terminal addressed by the particular message responds. Since the whole process is time-sequence

as 150 msec.

Some synchronous telephone-type modems continually perform diagnostic routines across the telephone line to provide adaptive equalization in response to changes in circuit quality. This may result in a change in transmission speed between modems to maintain effective communications. It may also add 20% to 50% to the cost of a standard line modem.

Radio modems, on the other hand, do not require this type of operation. Radio modems work over the radio medium; the medium's response at the frequencies used for data transmission remains constant over time.

An additional feature of synchronous radio modems is the ability to operate from clock signals derived from the host system or generated by the modem itself as with regular telephone modems.

Ready-to-send/clear-to-send delay is also selectable from 25 to 150 msec to match current requirements by in-place line modems.

In addition, provisions are made for both terminal and radio anti-streaming to prevent either a continuously "on" terminal, or radio transmitter, from tying up the radio channel. In the latter case, a unique radio network protection circuit will remove the radio modem from service.

Radio ranges

One of the most common questions asked about radio modems is, "What is the range?" The answer, generally speaking, is, "What you design the system for."

Designing an appropriate system means providing the necessary radio paths to achieve adequate signal levels at all points of the network. Antenna height and gain have more impact than power output, since power and other factors are usually limited by Federal Communications Commission regulations and economics.

Several years ago, a band of channels in the 900-MHz range was allocated by the FCC for multipoint networks. This band is considered ideal for this purpose because of the minimal effect of noise generated by man-made de-

Radio modems of the type now available have a very short "learning" or synchronization time, thus increasing the throughput efficiency, or amount of available transmission time for usable data.

phone modem and line combination. Radio modems of the type now available have a very short "learning" or synchronization time (usually 25 msec or less), thus increasing the throughput efficiency, or amount of available transmission time for usable data.

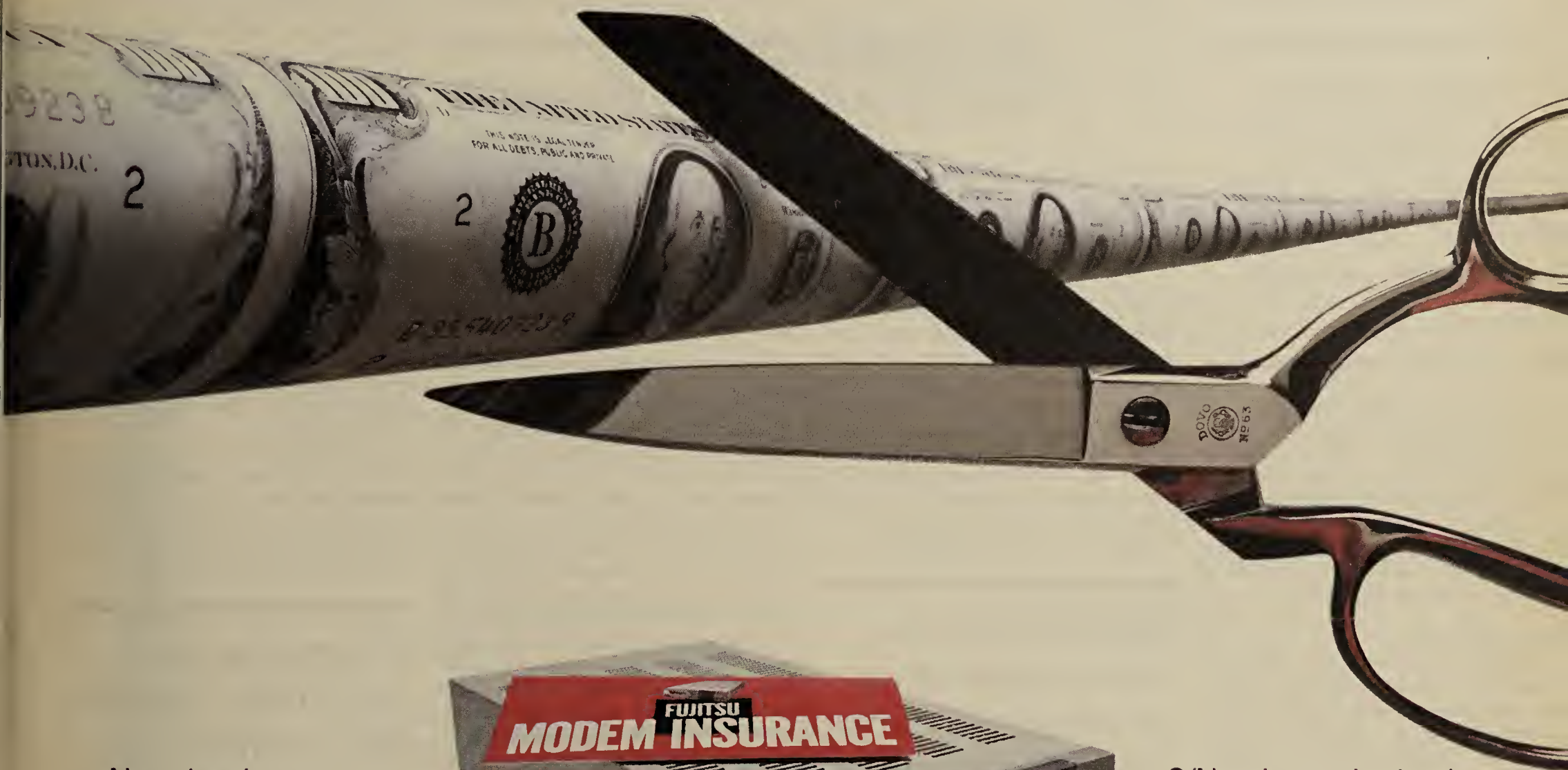
Learning time for standard telephone line modems ranges as high

vices at these frequencies and because a relatively good range of up to 30 miles may be obtained with gain antennas in fixed service.

The performance of a system will be as consistent as the integrity of the radio signal paths between host and remote, or drop, sites. These are affected by

Continued on page 44

Cut your line costs in half with Fujitsu's 19.2 Kbps modem.



Now there's an easy way to increase your throughput without increasing your line costs.

With Fujitsu's new two-channel, stand-alone modem, you can send twice the information of a 9600 bps modem without adding additional lines. This can save you up to \$1500 per month for each leased line used for coast-to-coast communications.

Fujitsu's 19.2 Kbps modem is Trellis-coded and available with an optional six-channel TDM that supports up to eight channels of data, with speeds ranging from 2.4 to 19.2 Kbps.

Advanced diagnostics allow the user to monitor the phone line to ensure that critical standards such as

S/N ratio, receive level and phase jitter are maintained.

The 19.2 Kbps modem is covered by the most outrageous guarantee in the modem business: Fujitsu Modem Insurance.

If your modem fails during the first year, we'll give you another modem. For free. And we'll fix the first one. Also for free.*

Now you can cut line costs and increase throughput with the surprisingly affordable Fujitsu 19.2 Kbps modem.

For the name of a Fujitsu distributor near you, call 800-422-4878; in California, 408-434-0460.

FUJITSU

FUJITSU AMERICA
DATA COMMUNICATIONS

*This limited offer for Fujitsu Modem Insurance is only open to new purchases of 19.2 Kbps modems from an authorized Fujitsu America distributor and is subject to the terms of our Modem Insurance Policy.

Please send me more information about the **Fujitsu 19.2 modem.**

Name _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone # _____ Title _____

FUJITSU AMERICA
DATA COMMUNICATIONS
3055 Orchard Drive
San Jose, CA 95134

Data's greatest hits

continued from page 42

changes in terrain or building construction. Interference from other radio systems is virtually nonexistent, as the band is solely dedicated to these point-to-point networks and allocation of specific frequencies is made to a particular user in a given area.

The same frequency is not assigned again for a minimum of 70

A major factor that needs to be considered is the cost of antenna installation and materials.

miles between the outer edges of systems occupying the same channel. Licensees who meet minimum channel-loading requirements (usually four remote sites) are given exclusive use of the channel, thereby precluding the possible problem of having to share the channel with another user.

The big payoff

As noted earlier, the use of radio modems is a cost-effective data communications solution in areas where leased or dedicated data lines are expensive, not readily available or impractical due to low usage requirements. For these applications, the cost payback of radio modem systems can be very attractive in terms of the ongoing monthly cost of the leased lines they replace.

Generally speaking, the payback period of a radio modem system is equal to the total radio modem cost divided by the current monthly costs of the leased lines they replace. A major factor that needs to be considered is the cost of antenna installation and materials. Antenna cost may range from inexpensively mounting an antenna on a small building to obtaining more

favorable heights through the use of tall buildings or towers, which may cost thousands of dollars per location.

However, such large installations are usually present only in networks with many widely dispersed receivers, and they are usually counterbalanced by the expected price increases in leased lines over a few years.

Payback periods for systems installed to date have ranged from 24 to 48 months. These estimates don't take into account the alternative installation and possible future relocation costs of leased lines, which can be substantial.

Current uses

Radio modems are currently being used to provide data communications capabilities to a variety of businesses and organizations, ranging from connecting main libraries with bookmobiles and branches, to connecting grain terminal operators together for price communications in volatile commodity markets. They have also been used to provide a transmission network between automated monitoring and control systems in such diverse locations as mining pits, large industrial plants and large urban electric utilities.

Future uses of radio-based data transmission are limited only by radio spectrum availability.

Almost any data transmission application can be performed via radio waves. Future uses of radio-based data transmission are limited only by radio-spectrum availability. New systems are being designed for point-of-sale, automated teller machine networks and other applications for which leased lines have been the traditional medium of choice. ■

Managing LAN security

continued from page 40

is moved, security does not have to be set up again.

However, there are potential disadvantages to storing security information separate from the resource itself. If the server where security information resides is down, resources on other servers

Usage accounting can also serve a security function, in that it records all usage of the network.

become inaccessible. If it is running slow, access to resources on other servers is slowed, too. Thus, in practice, users may end up relocating security information when a resource is moved.

With hierarchical networks, including minicomputers and mainframes, security issues become still more complicated. If, for instance, it is possible to log on to the local-area network, and from the local net to a minicomputer, and from the minicomputer to a mainframe, it is tedious (though not unusual) to have to supply three separate user IDs and passwords.

By contrast, if the process of logging on to the minicomputer and mainframe is automated, so that the user doesn't have to provide those user names and passwords, the system becomes much less secure. In fact, users themselves may unilaterally automate the process using script file features of communications programs such as CrossTalk Communications/Digital Communications Associates, Inc.'s CrossTalk or even through the use of keyboard macrocomputers. One approach to this problem is to set up a central logon server. Users log on to this machine, which knows

each user's rights throughout the network and sets up the requested connections.

Usage accounting

The main purpose of usage accounting is to allow businesses to charge departments for use of the local-area network. However, accounting can also serve a security function, in that it records all usage of the network and can be used to lock users out by disabling their accounts or reducing their credit to nothing.

Among major local net vendors, only Novell's NetWare 2.1 currently provides such a system as an integrated feature.

Among other things, a network manager can determine, for a given server and user, total connect time, disk blocks read and disk blocks written. A usage-accounting system can be used to monitor activity only, or it can be used, preemptively, to control activity. For instance, noting that a particular user has read multiple megabytes from a server, the manager could find out why.

Or the manager could set the credit limit for that user low enough so the user could not read that many megabytes without exhausting the account balance and getting disconnected.

Education and high-tech features are of little use if users don't like or use the system.

The key to effective security management, as in any effective network management, is motivating users. Education and high-tech features are of little use if users don't like or use the system.

A good manager inspires commitment to the security system by working with users, not against them. ■

Letters:

Editor:

Regarding "Pointing the way to X.32" (Sept. 14) by Robert Fultz (product group manager at Tymnet, McDonnell Douglas Network Systems Co.): X.32 access to a packet-switched network allows a user to open several simultaneous sessions to different destinations, transmit arbitrary binary data patterns (rather than ASCII characters), get 2,400 or 4.8K information bit/sec without wasting two out of every ten of those bits for the start/stop bits that are required when accessing via an asynchronous connection to a packet as-

sembler/disassembler.

A V.22bis modem with a synchronous interface does not cost significantly more than a V.22bis modem *without* the switch to bypass the *additional* circuitry necessary for asynchronous operation. (A V.22bis modem establishes a synchronous phone-line connection and then uses additional circuitry to support asynchronous interfaces.)

Fultz should stop giving reasons for not using the X.32 service and get Tymnet out leading the way to widespread use of this superior interface.

Walt Roehr
Executive director
Telecommunication Networks
Consulting
Reston, Va.

Editor:

An article by Bob Wallace in your Oct. 26 issue ("IBM boosts telecom efforts in Europe") erroneously reports that I maintained IBM is not in the telecommunications business.

What I said was that IBM is not in the basic transmission business. I think most people would today define telecommunications as encompassing much, much more than basic transmission.

In today's evolving telecommunications market, IBM has been, and will continue to be, a major player.

Helmut Schmidt
Vice-president of
telecommunications
IBM Europe

Editor:

Thank you for your Nov. 16 article by Pam Powers, "Examining technospeak's unbridled reign of terror." The "verbizing" of nouns (if you will pardon the expression) has driven me nuts for years. Every "impact" I hear sets my teeth on edge. I am delighted to know that not everyone in the publishing industry has given up and started impacting everything in sight.

Richard Mullen
Chevy Chase, Md.

Network World welcomes letters from its readers. They should be typed, double-spaced and no longer than 150 words. Letters may be edited for space and clarity.

Thanks, ICA members, for making Network World your best-read communications-oriented publication.

NETWORK WORLD

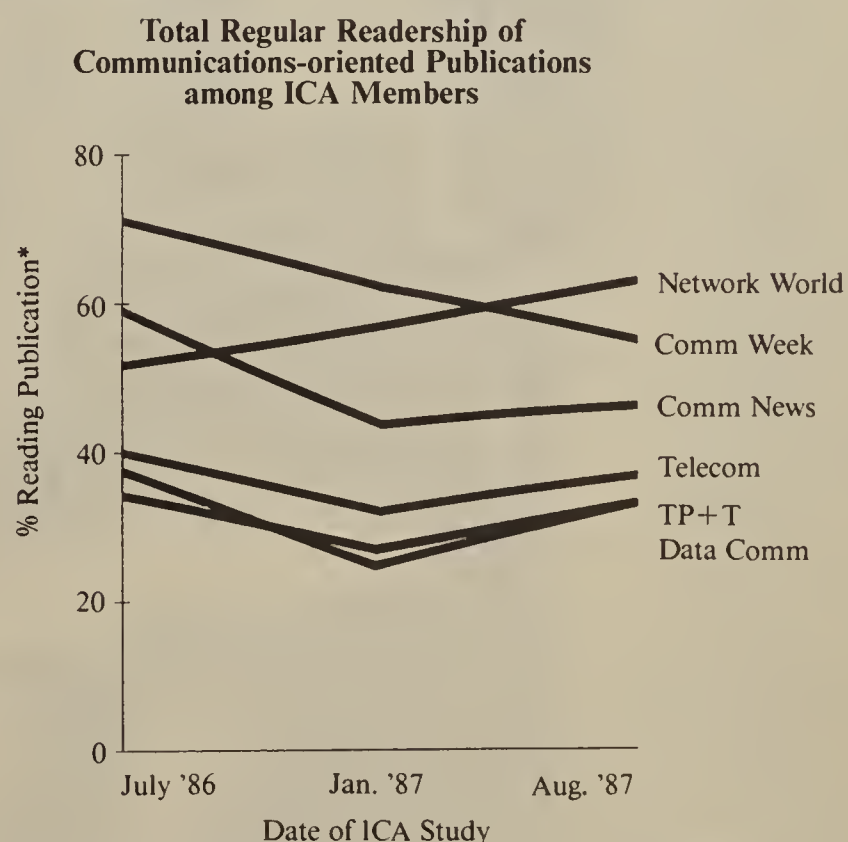
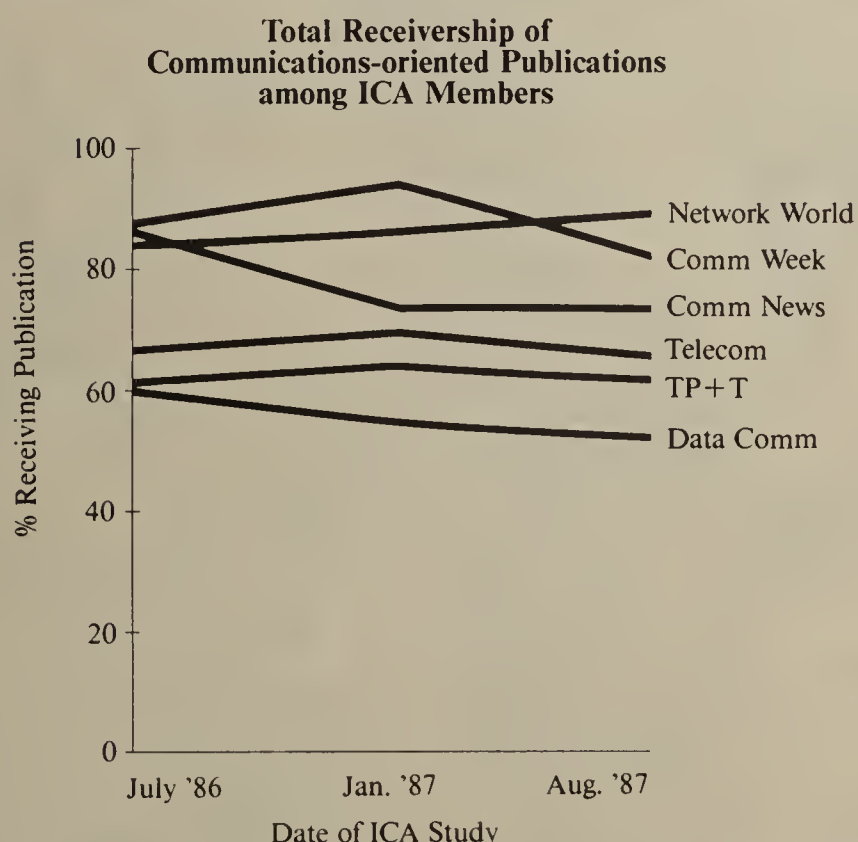
Gary J. Beach
Publisher

"Rome wasn't built in a day." Although you've heard this saying time and time again, the philosophy behind it — that through hard work you can make things better day by day, week by week, and year by year — remains sound.

It's this very philosophy that *Network World* editors have followed during the past 18 months. And in doing so, they have remained true to their initial goal: to make each issue of *Network World* the best possible for you, our readers.

Evidence is growing that *Network World's* long-term commitment to editorial excellence is paying off. In fact, the latest study conducted by an independent research firm among ICA members shows rather impressive results. Not only does *Network World* top the list of communications-oriented publications in receivership, but it now ranks number one in readership as well.

As you can see in the following charts, both receivership and readership of *Network World* among ICA members have steadily increased since July 1986. However, during this time period, these same ratings have declined for almost every other communications-oriented publication.



* Readership figure for each publication is based on the number of ICA members who receive that publication. Studies conducted by First Market Research of Boston.

There's no question about it. *Network World's* in-depth networking coverage is what enables us to deliver a unique editorial product that progressive communications users have come to rely on week after week.

Thanks to the growing support of ICA members and continued dedication of all our readers, *Network World* is now the number one communications-oriented publication for today's leading-edge users.


Cordially,

Gary J. Beach

Gary J. Beach
Publisher

375 Cochituate Road, Box 9171, Framingham, MA 01701-9171, (617) 879-0700
An IDG Communications Publication

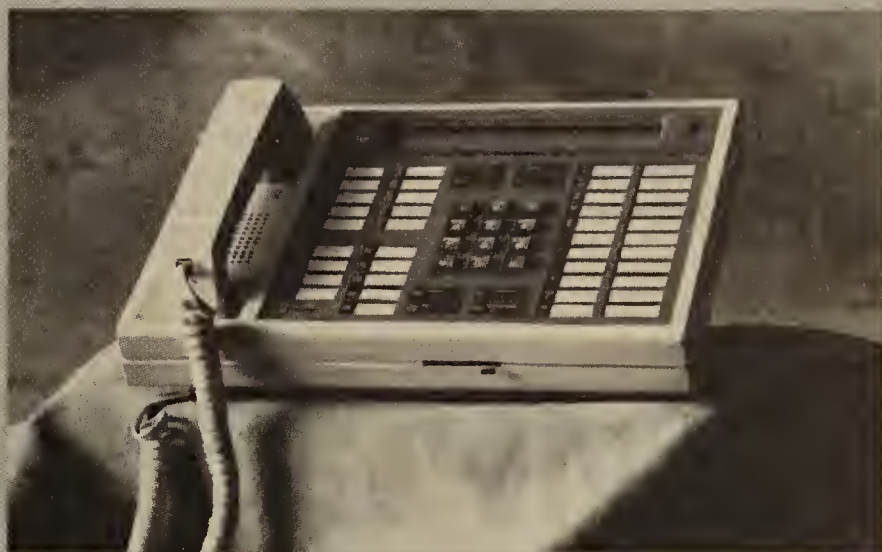




“I called three times and got cut off three times. Then I thought, what if I'd been a customer? Would I have bothered?”

My plane was late so I wanted to let the office know. Well, I'm trying to call but nobody's picking up. I start counting the rings and I'm up to 12 when, finally, somebody picks up and mumbles "lobby." Then click, I'm disconnected. Three times in a row this happens. And I'm just about to boil. I'm thinking, what's happening to other callers? How many sales are falling through the cracks? Why did we ever gamble with this cursed phone system when we knew

AT&T comes through.”



AT&T Messaging Solutions

With an AT&T System 85 or 75, you can permanently remove communications barriers between your people and your customers. Reason: AT&T's *Unified Messaging* products provide the widest range of integrated messaging options in the industry, so virtually no calls will go unanswered.

Example: *Audio Information Exchange* or AUDIX lets users send or retrieve *spoken* messages around the clock, through a company-wide message-recording system.

Example: Through a *Message Center*, your trained staff can intercept unanswered calls. And provide up-to-the-minute information on your people, wherever they are.

To learn more, contact your AT&T Account Executive. Or call 1 800 247-1212.

From equipment to networking, from computers to communications, AT&T is the right choice.

© 1987 AT&T



AT&T

The right choice.

TRAINING

SAN FRANCISCO: 18004 Sky Park Circle, Suite 100, Irvine, CA 92714,
Barbara B. Murphy, Regional Manager, (415) 322-3314,
Chris Glenn, Account Executive, (800) 343-6474

DATA PROCESSING PROFESSIONALS

Join one of the fastest growing consulting firms in the South-east! Overwhelming demand has created new openings in the areas serviced by our NASHVILLE, TN; CHARLOTTE, NC; and COLUMBIA, SC offices in the following areas:

- NASTRAN/ANSYS
- DB2/SQL
- CSP BASIS
- TANDEM (1-3 yrs. experience)
- VAX, INGRES or RDB
- IDMS, ADS/O, ADS/A (1-3 yrs. experience)
- DATA MODELING
- HABITAT
- MODEL 204 (2-4 yrs. experience)
- NATURAL/ADABAS
- SERIES 1/EDL
- PL/1
- Q CLEARED

We offer excellent benefits and competitive salaries. Call or send resume to our Corporate Office today:



AMERICAN COMPUTER PROFESSIONALS
P.O. Box 5125
Columbia, SC 29250
1/800/332-0555
Equal Opportunity Employer

Communication Networks (CN)

Special Communication Networks (CN) Show Issue - January 25th

Closes: January 13th

Interface

Special Interface Show Issue - March 28th

Closes: March 16th

World Congress On Computing (WCC)

Special World Congress on Computing (WCC) Show Issue - March 28th

Closes: March 16th

Comdex Spring

Special Comdex Spring Show Issue - May 9th

Closes: April 27th

Bonus Shows & Hotel Distribution

Call for further information on advertising in these Special Issues.

NETWORK WORLD

Contact:
Classified Advertising,
375 Cochituate Road,
P.O. Box 9171,
Framingham, MA
01701-9171

1-800-343-6474
(In Mass) 617-879-0700

SOFTWARE ENGINEERS

The Technology And Diversity Is Ours -- The Challenge Is Yours

Sanders Associates, a Lockheed Company, is one of the world's leading producers of advanced defense electronics and systems. We are a multi-divisional company whose products cover a wide spectrum of programs including surveillance systems, air defense radars, training and simulation, automated test equipment, air traffic control and countermeasures. As a company we are committed to the design, development and manufacture of state-of-the-art systems to meet our customer needs.

For a software engineer this equates to a technically challenging environment with diversified programs and career opportunities.

PROJECT TEAM LEADERS

With an emphasis on technical leadership, you will be responsible for software development projects involving minicomputer and microprocessor based military electronic or computer application systems.

Qualified applicants will need either a BSCS, BSEE or other technical degree and at least 8 years of experience in the design and implementation of real-time systems. You must also have a proven ability to deal with customers and perform requirements analysis/definition, project costing, scheduling and staffing. Hands on experience with state-of-the-art operating systems and higher-order languages like Ada (TM), Pascal and C is required.

SYSTEMS ENGINEERS

Providing technical leadership on projects, you will be responsible for the software development of various major military electronic systems.

To qualify, you will need either a BSCS, BSEE or other technical degree and at least 8 years of experience in hardware/software development. Previous project management experience with minicomputer and microprocessor systems development is also required.

SOFTWARE DESIGNERS

Opportunities are available as described below. To qualify the general requirements include either a BSCS or BSEE and a minimum of 4 years' experience with higher order languages Pascal, C or Ada (TM).

- **MICROPROCESSOR BASED APPLICATIONS:**

You will be involved with assembly and higher order language development for VAX, Intel 8080/8086, MC 68000, LSI 11/23 and/or PDP-11 processors.

- **ADA/ADA PDL:**

The successful software candidate will design, utilizing techniques/standards like Petrinets/DoD-STD-2167, MIL-STD-CAIS, related KIT activities and development support of Ada tools.

- **DATA BASE MANAGEMENT:**

This position involves distributed data bases across network nodes, data base machines, flow concepts and modern relational data base management systems like INGRES.

- **AUTOMATED TEST EQUIPMENT APPLICATIONS DEVELOPMENT:**

You will be involved in test set executives/program sets, microprocessor controlled interfaces and hardware simulation tools. Previous PDP-11, RSX-11 experience a plus.

- **GRAPHICS APPLICATIONS:**

The successful candidate will work with Raster Graphics, Windowing Systems, CAD/CAM graphics, GKS, Phigs and GCI. Previous experience with avionics packages, display graphics processors and operator interfaces is preferred.

- **COUNTERMEASURE APPLICATIONS:**

You will identify, define and develop reconfigurability requirements and provide analysis/design for EW countermeasure systems, including local executive operating systems, kernels for multiple microprocessors, data base maintenance and reprogramming applications.

In addition to a technically challenging and diversified environment, Sanders offers an excellent compensation and benefits package. Sanders southern New Hampshire location, with no sales tax or income tax; combines the best of what New England offers; close proximity to the mountains, the ocean and Boston.

For immediate confidential consideration, please forward your resume, including salary history to: Sanders Associates Inc., Attn: 7040DH, C.S. 2029, Nashua, New Hampshire 03061-2029.

Ada is a registered trademark of the U.S. government (A.J.P.O.)

An Equal Opportunity/Affirmative Action Employer
U.S. Citizenship Required.

 **Sanders**
A Lockheed Company

Electronics

LAN TECHNICAL SUPPORT SPECIALIST

Zenith, one of America's premier electronic manufacturers and leader in the microcomputer marketplace, is expanding into the exciting area of computer networking. Our unique marketing plan and state-of-the-art technology has created an exceptional growth opportunity for a Technical Support Specialist.

The position is responsible for customer support and training, problem solving and assisting our marketing efforts by providing technical information regarding networking product capabilities, configuration of equipment, application analysis and reporting. We require a degree in Engineering, Computer Science or equivalent computer electronics experience plus 3-5 years of relevant experience, 2 of which are in broadband Networking.

We provide an exceptional salary and benefits package, an environment of technical and professional excellence and the growth that accompanies brand new opportunities. For confidential consideration, please send your resume to: **Zenith Electronics Corporation, Dept. SMS, 1000 Milwaukee Avenue, Glenview, IL 60025.** Equal Opportunity Employer M/F/H/V.



ZENITH
Electronics
Corporation



A NEW DAY...

And a new dimension for your career. Data Dimensions, Inc., one of the largest software consulting firms in Southern California, offers you the opportunity to explore exciting career and project employment openings for us or for our clients. Our immediate openings are in the following areas:

Technical Specialists

- ☐ Project Leaders, Managers, Directors, Management Consultants
- ☐ Programmers, Programmer/Analysts, Systems Analysts,
- ☐ DBA 's, System Programmers, Communications Specialists
- ☐ Training Specialists, Technical Writers
- ☐ Package Implementation Specialists, Industry Specialists

Technical Specialties

- ☐ IBM - Mainframes, System 38, MICROS, IMS, DB2, IDMS, FOCUS, MODEL 204, CICS, PL/1, COBOL, RPGIII, ASSEMBLER, MSA, M&D, HOGAN, COPICS, M&I
- ☐ HP 3000, 1000, 9000, PASCAL, UNIX, 'C', COBOL, IMAGE, 4GL's
- ☐ DEC VAX — CORTEX — Application Factory, 4GL, COBOL, PASCAL, 'C', INTERGRAPH

For further and faster career growth, call Judy Abad, or send resume to: **Data Dimensions, Inc., 24404 Vermont Ave., 200D, Harbor City, CA 90710, (213) 539-9610.** EOE.



DATA DIMENSIONS, INC.

TELECOMMUNICATIONS:

Three tenure-track positions available in the area of telecommunications. Ph.D. preferred; however, for *one* of the positions an MSEE or BSEE plus MBA with considerable telecommunications related industrial experience will be considered. A strong interest in teaching and the ability to initiate and conduct funded research programs are desired. Rank and salary commensurate with background and experience. Applications will be accepted until January 1, 1988 or until the positions are filled. To apply, send a letter of interest, a resume and the names of three references to:
Dr. W. A. Klos, Department of Electrical & Computer Engineering, University of Southwestern Louisiana, P. O. Box 43890, Lafayette, LA 70504.
An affirmative action, equal opportunity employer.

REGIONAL SALES MANAGERS

A top income and career opportunity for professional field sales personnel selling local area networks to OEM's and Fortune 1000 end users in Los Angeles and Boston.

We are an established designer and manufacturer of LAN equipment undergoing a major expansion in new product introduction and sales. A good working knowledge of data communications, microcomputers, or LAN's, and willingness to travel is required.

We offer an excellent compensation package of base salary, commission, car allowance, medical/dental, 401K. Resume to: TCL Inc., 47621 Westinghouse Dr., Freemont, CA 94539

SAN DIEGO CALIFORNIA OPPORTUNITY

Immediate opening for a VAX/VMS Systems Manager and Applications Programmer at San Diego Apparel Manufacturer. Minimum of 3 years experience in DCL, VMS operations, toning and utilities and VAX COBOL, FMS and RMS. Responsibilities involve maintenance and enhancement of existing software, additional program development, system analysis and project management. Send resume to:
Ratner Corp.
P.O. Box 2112
San Diego, CA 92112
Attn: Mrs. Letha Brown

Sales PC Networking And Communications

Top ten LAN vendor seeks sales people for PC networking and communications products. Exp in Novell, Banyan, PCs and mainframes a plus. Company paid benefits. Base salary plus commission. 6 figure potential for high flyers! Please send resume with salary history to

VP Sales
Access Data Products, Inc.
589 Warren Avenue
East Providence, RI 02914

NETWORK WORLD

A number of Management Updates, Data Comm Buyer's Guides, Telecom Buyer's Guides, PC Buyer's Guides and Industry Focuses are scheduled to run in **NETWORK WORLD** during 1988. Each of these features will focus on one aspect of the networking and communications industry and give our advertisers a chance to reach a more select audience. These are some of the topics the features will cover:

Management Updates:

Network and Communications managers gain the edge they need -- and advertisers gain a receptive audience -- from in-depth discussions of key issues in *Network World's* Management Updates. The focused editorial in these sections provides managers with invaluable assistance in planning and optimizing their networks.

- * January 4 - Negotiating with Vendors (Early close due to Holiday)
- * February 1 - Developing Your Management Style
- * March 7 - The Network as a Profit Center
- * April 4 - Managing Consultants
- * May 2 - Dealing with Problem Employees
- * May 23 - PC Management Update: Networking PCs
- * June 6 - ISDN
- * June 20 - Telecom Management Update: Short-haul Transmission
- * June 27 - PC Management Update: DBMS Networking
- * July 4 - Network Security
- * August 1 - Hiring and Keeping a Technical Staff
- * September 5 - User Excellence Awards

Buyer's Guides:

Products and services are front and center in these Buyer's Guides, providing *Network World* readers -- your customers -- with the important information they need. Here's where they get the information that helps them make the most informed buying decisions for a variety of products and services.

Data Comm Buyer's Guides:

- * January 11 - T-1 Multiplexers (Early close due to Holiday)
- * February 8 - Modems (below 9600 bps)
- * March 14 - Network Management and Test Equipment
- * April 11 - High-end Multiplexers
- * May 9 - Packet Switches
- * June 13 - Network Management Systems
- * July 11 - Gateways
- * August 8 - Modems (9600 bps and higher)
- * September 12 - Packet Switching Services

Telecom Buyer's Guides:

- * January 18 - DSU/CSUs (Early close due to Holiday)
- * February 15 - Digital PBXs (above 300 lines)
- * March 21 - Facsimile Equipment and Software
- * April 18 - Long-haul Carrier Services
- * May 16 - Network Support Services
- * July 18 - Hybrids and Small PBXs (under 300 lines)
- * August 15 - Voice Messaging
- * September 19 - International Communications Services

PC Buyer's Guides:

- * January 25 - Microcomputer Communications Software
- * February 22 - Ethernet LANS
- * March 28 - Micro-to-host Links
- * April 25 - Token-passing LANs
- * September 26 - LAN Servers

Industry Focuses:

This year *Network World* introduces a new feature that takes a close look at vertical markets with special networking needs. The Industry Focus sections are mailed directly to top decision makers in financial, retail/point-of-sale, government, travel, manufacturing, education and insurance industries, giving you added reach into these important market segments.

- * February 29 - Government
- * May 30 - Education
- * July 25 - Financial Services
- * August 22 - Travel
- * August 29 - Retail/Point-of-Sale

Editorial Show Coverage:

Bonus Show Distribution - Your advertisement reaches thousands of show attendees at no extra cost, when *Network World* distributes bonus copies at the industry's major trade shows. It's a great way to expand your marketing opportunities -- and make your advertising dollars go even further.

- * January 18 - CN Preview Issue (Early close due to Holiday)
- * January 25 - Communication Networks (CN) Show Issue (Bonus Show Distribution)
- * February 1 - CN Wrap-Up Issue
- * March 21 - Interface Preview Issue
- * March 28 - Interface Show Issue (Bonus Show Distribution)
- * March 28 - World Congress on Computing (WCC) Show Issue (Bonus Show Distribution)
- * April 4 - Interface Wrap-up Issue
- * May 9 - Comdex Spring Show Issue (Bonus Show Distribution)
- * May 9 - ICA Preview Issue
- * May 16 - ICA Show Issue (Bonus Show Distribution)
- * May 23 - ICA Wrap-up Issue
- * September 19 - TCA Preview Issue
- * September 26 - TCA Show Issue (Bonus Show Distribution)

NETWORK WORLD publishes every Monday with an ad deadline of 12 days prior to each issue date. The Combined Issue of December 28, 1987 & January 4, 1988 will be closing December 16th, 1987. You may send in copy to be pubset or camera-ready material (velox or negative) via the mail. We provide telecopier service and will also take ads over the phone.

Our mailing address is
NETWORK WORLD
Classified Advertising, PO Box 9171, 375 Cochituate Road, Framingham, MA 01701-9171
Or call for more information at: 1-800-343-6474 or, in Massachusetts, (617) 879-0700

M.I.S./MANAGER, TECHNICAL SUPPORT & COMPUTER OPERATIONS

We're looking for a dynamic MIS professional with at least 7 years of data processing (technical and/or operations) experience that include supervisory responsibilities and exposure to manufacturing and financial systems. Successful candidate will manage the data center consisting of 2 IBM 4341's VM/DOS/VSE/CICS, provide planning consultation and advisory services on Operations developments, technical support issues and will oversee specific major projects.

Responsibilities will include the analysis of Kaman's systems software requirements including specific needs for the operating system. Develops and implements procedural standards for Operations functions and determines production requirements through interface with other MIS sections. Manages a staff of qualified systems software programmers and operations personnel. This is a very visible position reporting to the MIS Director and interfacing with all levels of management within the company. A four year degree (or equivalent), good communication and managerial skills are required.

M.I.S./MANAGER OF SYSTEMS AND PROGRAMMING

A dynamic individual with strong interpersonal, communication, and organizational skills is needed to help build a highly effective and responsive system and programming organization, ready to meet the ever-expanding challenges of Kaman Aerospace.

The successful candidate should possess a thorough understanding of business concepts and manufacturing systems, preferably as they apply in the aerospace industry, along with a solid technical background including a working knowledge of COBOL, VSAM, CICS, and JCL in an IBM 4341 DOS/VSE environment running under VM. 7-10 years of experience in programming and systems analysis (at least 3 years of which involved managerial responsibility), a 4 year degree (or equivalent), good communication and team building and leading skills are a must.

This is highly visible position reporting to the MIS director and interfacing with all levels of management within the company. It offers the opportunity to really make a difference and to be an important part of a team effort, if you're the right person.

If you are interested in joining a growing company and a MIS department now making plans for major hardware and software improvements, offering a competitive salary/benefits package, we are interested in hearing from you. Please send your resume with salary requirements in confidence to: Employment Office, Kaman Aerospace Corporation, P.O. Box 2, Bloomfield, CT 06002. Equal Opportunity Employer. M/F/H/V.

Kaman Aerospace Corporation

KAMAN

Senior Analyst/Programmer

The Grocery Products Division at our St. Louis headquarters is seeking a Senior Analyst/Programmer.

This position is responsible for the analysis, design, development and support of systems on large-scale IBM computers and distributed mini-computers. Application areas supported are Marketing, Sales, Accounting, Production, Research and Distribution. Four-six years' experience in COBOL and a degree in Computer Science or related business degree are required. A working knowledge of structured programming concepts and experience with IBM software and hardware will be very helpful. Work experience with DMS, TSO, Datacom/DB, IDEAL, IMS, JCL, SPF, RAMIS, SAS, and/or IFPF would be a definite plus.

We offer an excellent salary and generous company benefits. If interested, send resume and salary history to: Tim J. Toma; Manager, Employment; Grocery Products Division; RALSTON PURINA COMPANY; Department GP-97; Checkerboard Square; St. Louis, MO 63164. An Equal Opportunity Employer M/F/H/V.



Ralston Purina Company

In today's highly competitive food business, it takes a tremendous amount of pride and skill to maintain a position of leadership. As a dynamic force in the food brokerage industry, we are seeking aggressive individuals ready to pick up our fast pace of success.

VAX/VMS CLUSTER

Steady growth and internal promotions have created the following openings in our Data Processing Department for individuals with excellent project planning and communications skills. Previous experience with VAX/VMS systems and COBOL a must.

Senior Systems Programmer

You will be responsible for providing technical support to operations and applications development, as well as the installation and maintenance of systems software in a VAX/VMS cluster environment.

Position requires 3-5 years' experience in VAX/VMS systems management, performance measurement and hardware configuration planning. Knowledge of COBOL applications development required. Experience with IBM PCs or compatibles preferred.

Senior Applications Programmer/Analyst

You will be responsible for the development and support of Customer Service and Sales Management applications in a VAX/VMS cluster environment.

Position requires a minimum of 4-6 years' experience in related applications development, and a strong technical background with VAX/VMS COBOL and RMS, as well as a solid understanding of data communications and VMS software concepts. Experience with IBM PCs or compatibles helpful. Knowledge of EDI, UCS and EASYLINK preferred.

If you are interested in joining our winning team, we offer a compensation plan designed for today's MIS professional, as well as unlimited advancement opportunities and an excellent benefit package including:

- GROUP HEALTH & LIFE INSURANCE
- PROFIT SHARING
- EDUCATIONAL ASSISTANCE
- GROUP INSURANCE PRESCRIPTION DRUG PLAN
- PAYROLL DEDUCTION CREDIT UNION
- AND MORE

Interested candidates should forward a resume to Steven Loffredo, Personnel Representative.



merkert enterprises inc.

500 TURNPIKE STREET
CANTON, MA 02021

An Equal Opportunity Employer

Software Solutions

STABILITY • SECURITY • CAREER

If these issues are your main concerns, then contact SOFTWARE SOLUTIONS. We are ready to hire skilled individuals with a serious interest in becoming part of an elite organization. Preferred qualifications include:

- IMS DB/DC
- CICS
- System /38, /36
- TOTAL
- PL/1 or COBOL
- MVS.XA Internals
- RPG III
- ALC

For assurance of our commitment to your career development, with quality compensation and benefits, contact Mary Braun at (214) 991-2453.

Software Solutions

16051 Addison Rd. Suite 325 • Dallas, TX 75248

Professional Success Through Consulting Excellence

FACULTY POSITION COMPUTER SCIENCES SCHOOL OF PUBLIC HEALTH UNIVERSITY OF ALABAMA AT BIRMINGHAM

This is a tenure-track position with responsibilities that include teaching and the applications of computer sciences in research. The individual selected will also collaborate with faculty members on research and will lead the faculty of the School in developing advanced and responsive data management systems.

A Ph.D. in computer sciences (or in biostatistics or epidemiology) is required along with familiarity with hardware and software, as well as a good perspective on the future evolution of computer sciences.

Interested persons should send their curriculum vitae to Philip Cole, M.D., Chairman, Department of Epidemiology, School of Public Health, University of Alabama at Birmingham, University Station, Birmingham, AL 35294. Applications will be accepted until February 28, 1988 or until position is filled.

UAB IS AN EQUAL OPPORTUNITY AFFIRMATIVE ACTION EMPLOYER.

Reminder:

**The Combined
December 28th/
January 4th
Issue
Closes
December 16th**

For More Information
On Classified Advertising
Please Call 1-800-343-6474
(In MA 617-879-0700)

EMPLOYMENT WANTED

\$500. REWARD...

For successful job lead. 32 years old, living in Denver, willing to relocate. 11 years telephony experience, recently calling on telcos, distributors, interconnects and end users for manufacturer. Seeking for regional or national position. Previous interconnect and (in-house) telecom manager experience. Please call (303) 333-6633.

PEOPLEWARE from THOR SM



OFFICES THROUGHOUT SOUTHERN CALIFORNIA

Los Angeles
4055 Wilshire Blvd., Suite 250
Los Angeles, CA, 90010
213-487-0130

- MIS Directors
- Data Processing Managers
- System Analysis & Programming
- Data Processing Operations
- Personal Computer Specialist (PC)
- Typesetting and Desktop Publishing

100% Employer Paid ▲

TEMPORARY & PERMANENT PLACEMENT

Office Locations
Santa Ana
714-973-1783
Canoga Park
818-710-1800
Pasadena
818-795-2202
Torrance
213-373-0922
Riverside
714-824-2070

OVER 1000 PROFESSIONAL OPENINGS ON AN ONGOING BASIS

Users set goals for US Sprint

continued from page 2

45 days. We'd like to see Sprint get closer to that level."

He said the Users Association is not delivering an ultimatum to US Sprint. And the group plans to take no formal steps if Sprint does not comply with the interim guidelines. However, he added, "We include a number of large users. The message is, if they cannot improve their billing system, we will have to seek alternatives." Gallo said that a reply from US Sprint is expected in January.

The back office problems that have plagued US Sprint and caused billing problems led to the ouster of former company President Charles Skibo in July.

Upon taking office, his successor, Snedaker, replaced a number of senior management officials as a first step toward fixing the prob-

lems. In addition, Sprint created the position of vice-president of finance and information systems, a move industry watchers said was designed specifically to alleviate its back office congestion.

Gallo credited Snedaker with instituting positive changes at Sprint. "Sprint has demonstrated a real concern for users," Gallo said. "From Bob Snedaker down, we got the impression that Sprint is not just paying lip service to users' needs."

"The message is, if they cannot improve their billing system, we will have to seek alternatives."

Bard Haerland, staff vice-president of worldwide telecommunications for Unisys, said that Sprint has demonstrated that it can deliver

efficient billing and service. Haerland said that the carrier has dedicated a billing team to Unisys that intercepts Unisys' bills and corrects any errors before the computer company receives them. He also said he is reasonably pleased with the circuit provisioning Unisys has received from US Sprint. ▀

Rolm to become an IBM division

continued from page 2

will be internal, in management areas affecting personnel and finance policies," he said.

Dzubeck predicted that the Rolm name will be dropped in the near future. "I think retaining the Rolm name was foolish," he said. "The IBM name carries more clout."

Ian Angus, president of Angus Telemanagement Group, Inc. in Toronto, agreed with Dzubeck that the formation of the new division would have little direct effect on users. He speculated that IBM would, however, retain the Rolm name, which he said is a recognizable and respected one in the telecommunications industry.

Chuck Garrison, vice-president of telecommunications at the Chicago Board Options Exchange and president of the National Rolm Users Group, said IBM may drop the Rolm name in an effort to blur the distinction between voice communications and management information systems.

In October, IBM introduced a digital private branch exchange switch family that is smaller and more powerful than previous Rolm switches. The switches were introduced as IBM products manufactured by Rolm, an arrangement likely to continue, according to a Rolm spokeswoman.

Max Steinhardt, a managing partner at CTPS, Inc., a Mountain View, Calif., consulting company, described the IBM family of PBXs manufactured by Rolm as interim products "lacking full functionality." He said the new switches are examples of the need for IBM and its Rolm division to increase the speed of product development and release.

"There have been problems in terms of meeting deadlines and in terms of new functionality becoming available when it is supposed to," he said. The creation of Rolm as an IBM division is another stage in the breakdown of the barriers between the two companies that will cut costs and facilitate the creation and shipment of new products, Steinhardt said. ▀

Action Tech pushes MHS

continued from page 19

conversions, transmission and operation error checking. MHS operates as a task on top of X.400, LU 6.2 and other protocols, and it will transport messages across local networks, internetwork bridges, asynchronous and X.25 lines, and other media.

MHS will also exchange messages with other messaging services through gateways. Action Technologies is currently constructing a Systems Network Architecture gateway to transfer messages from MHS applications to IBM's SNA environment. The company has a prototype for an MHS gateway to Digital Equipment Corp.'s message-router service, Mellinger said.

Action Technologies developed MHS as part of its Coordinator application, an integrated package that includes E-mail, calendaring, scheduling and file management functions. Largely at Novell's request, Action Technologies announced in October 1986 that it would separate MHS as a utility, and both companies have published documentation on implementing it.

Novell became aware of MHS two years ago when it was looking for a generic E-mail facility that could run across multiple local net servers. The company has been extolling the advantages of MHS ever since. Since last January, Novell has sponsored a series of developers' seminars on supporting MHS. The company also recently announced it will bundle the service with NetWare 2.1 in early 1988, said Steve Pelfrey, director of strategic relations for Novell.

Currently, nine software developers are working to support MHS, and nearly 20 other developers have expressed strong interest in the utility, Pelfrey said. Two developers, Fourth Shift Corp. of

Minneapolis and SaleMaker Software of Grand Prairie, Texas, were prompted to support MHS by the same customer — Novell.

From its Provo, Utah, headquarters, Novell must coordinate sales and manufacturing information from more than 20 regional offices worldwide. Novell is committed to running its nearly \$200 million business solely on Personal Computer-based local networks, Pelfrey said. Prior to MHS, updating data bases on dispersed local nets was done via a mix of paper updates and a once-a-day download of data via T-1 lines between local networks.

"There are a couple of problems with that," Pelfrey said. "It's expensive, and it guarantees 24-hour-old data."

During the next seven months, Novell will be using applications that use MHS, including Fourth Shift, a manufacturing system, and SaleMaker, client management sales and marketing software. Novell will also be switching some of its T-1 lines to dial-up lines.

With MHS support for Fourth Shift, a regional sales office could generate a purchase order, and MHS would update the corporate data base automatically. In addition, if a regional stocking center were low on an item, an MHS message could be sent both to the manufacturing centers and to the corporate master program that schedules manufacturing, Pelfrey said.

"It's all happening without hands — MHS is doing it in the background," Pelfrey said. Data base updates among the more than 20 sites could be made as often as once an hour, he added.

Fourth Shift has developed a data import module that, when used with MHS, will allow data from virtually any type of file to

be brought into Fourth Shift, said John Carlson, vice-president of software engineering at Fourth Shift. Carlson said he expects the data import module to be bundled with MHS and made available in the spring.

Carlson said he believes the key applications for the data import module/MHS combination will be for remote order entry and centralized purchasing.

The module combination could also be used with Fourth Shift to create EDI applications for the automotive industry, for example, Carlson said.

"We've always been interested in tying remote sites to a central data base," Carlson said, but the company didn't want to invest the development effort to do it itself. "When MHS came along, we had the tools to do it, and now we're pursuing it aggressively," he added.

A new group of applications

Novell's Pelfrey said he believes "a new category of applications will arise because of MHS. We're going to be able to incorporate wide-area communications in so many applications because the overhead is so low." Novell would like to see MHS become a standard in the Personal Computer network market. "It will benefit the entire industry," he said.

Although Infonetics, Inc. Senior Analyst Nina Burns said she thinks MHS is a good communications solution, she doesn't see it taking off right away. She said the key to its success depends on how many applications and networking vendors support it. Since Action Technologies provides E-mail in the Coordinator, other vendors of local net E-mail packages may shy away from MHS, Burns said. Likewise, other local net vendors may steer clear of a technology that seems to have Novell's name on it, Burns added. ▀

X.12 gains momentum

continued from page 4

leader in logistics at Arthur D. Little, Inc., a market research and consulting firm based in Cambridge, Mass.

"Now we have a whole new kind of electronic data interchange, which we're calling direct exchange EDI, or DEX-EDI, where, rather than going over a telephone network, you've got one guy with a computer staring at another guy with a computer, and they plug them in directly," Norris said. "They can transmit the delivery record electronically and ultimately get rid of the paper."

Two methods of computer-to-computer transmission are being tested for this function: an RS-232 connection and a smart card, which is a credit card-sized device incorporating a microchip. The smart card reads and stores information from one computer for later transmission to a smart card reader, which communicates with a Personal Computer at the store.

TDCC — The Electronic Data Interchange Association, the event's Washington, D.C.-based sponsor, organized the workshops largely along the lines of vertical industries. "Every industry represented at the show is undertaking major programs in the implementation of EDI," said Edward Guilbert, president of the association.

The future of EDI standards is likely to involve both X.12 and the evolving standards for international EDI, called EDIFACT, according to Input's Wheatman. "What I see happening in the standards world is gradual migration towards X.12, while X.12 itself moves toward the international standards. There will be a convergence at some point in the future, maybe five or 10 years, where X.12 and the international EDIFACT standard are essentially linked." ▀

Novell details OS/2 support

continued from page 1

ment systems and communications gateways running on dedicated machines known as application servers, Novell said.

IBM and Microsoft Corp., developers of OS/2, have committed to using OS/2 as the base operating system on both workstations and servers. Both companies have developed OS/2-based local network products — in IBM's case, the LAN Server, which will run atop OS/2 Extended Edition, and in Microsoft's, the LAN Manager, codeveloped with 3Com Corp. This commitment will likely fuel development of distributed applications, in which programs are split between servers and workstations.

In order to remain compatible with IBM and Microsoft networking schemes, Novell is faced with supporting OS/2 on NetWare servers and OS/2-based workstations. To date, Novell has run its proprietary NetWare network operating system on the server and provided a component that runs on top of MS-DOS in the workstations.

Novell will continue with this arrangement. It has developed a new workstation component for NetWare 2.1 called the NetWare Requestor for OS/2. This is an OS/2 module that will provide NetWare services to OS/2 users.

Due to ship in the first quarter of 1988, the NetWare Requestor will allow Standard Edition OS/2 workstations to coexist with MS-DOS-based workstations on the same NetWare-based local net.

In addition, the NetWare Requestor for OS/2 will allow distributed OS/2 applications, such as data bases, to run in application servers and operate over a NetWare 2.1-based network.

For applications that need to run in the file server, Novell announced the NetWare Application Coprocessor. The coprocessor will be installed in the bus of the NetWare-based server and will run IBM's OS/2, the OS/2 applications and NetWare Requestor.

The coprocessor, to be offered for both the IBM Personal Computer AT bus and the Micro Channel bus, will be available after IBM ships OS/2 Extended Edition in the fourth quarter of 1988, Novell said. At the low end of its NetWare line, Novell said it is considering support of OS/2 server-based applications through a noncoprocessor implementation, but the company did not detail how this scheme might work.

J. Scott Haugdahl, senior systems specialist with Minneapolis-based Architecture Technology

Corp., said, "OS/2 is complex, and everything is becoming more intertwined. We're seeing less distinction between the operating system on the workstation and on the server." Novell is working with IBM to develop support for OS/2. Novell has never worked with Microsoft or licensed any of its products. By contrast, IBM provided Novell with technical and programming assistance in creating the Requestor.

Analysts said IBM has made it clear that OS/2 Extended Edition and the LAN Server are strategic products for personal computer local networking, and vendors such as Novell and 3Com will have to support IBM's networking scheme to remain prosperous.

"Novell has to be compatible with OS/2 software. They do not have a choice," said Thomas White, chairman and chief executive officer of Infonetics, Inc., a Santa Clara, Calif.-based research firm. "There will be server-based applications in the future that will be written for IBM's Extended Edition and LAN Server that will need to be supported."

White estimated Novell's NetWare is currently used in 43% of local network installations. Many of these installations are in companies that are heavy users of IBM equipment, making compatibility with IBM critical for Novell. □

Users differ on 19.2K

continued from page 3

and those can all handle 19.2," he said. Johnson Controls also uses Digital Equipment Corp. Microvaxes and Microvax IIs, which Colby said also work well at 19.2K bit/sec.

For users with on-line, real-time applications, 19.2K service might be an important service, according to Christopher Davis, vice-president of telecommunications at Rexnord, Inc. But for companies with a major investment in diagnostic modems and a network control center, such as Rexnord, digital services are not very attractive at any speed, Davis said.

"If you're a digital private-line user, the network control for the most part is done by AT&T in their office. But if you have your own staff and have diagnostic modems, there's quite a bit of money tied up in that," he said.

For lower speed digital data service users, Davis said 19.2K service could be a smart choice. "If you're using, say, 4.8 or 9.6 digital service, and you want to go at a higher speed, and you're in an environment where you don't have the network control center, I would think the transition from 9.6 digital service to 19.2 would be a fairly easy one." □

Sun Trust puts faith in fiber

continued from page 1

1.54M bit/sec T-1 channels, the same as a T-3 circuit, although the bank currently uses only four T-1 links. The fiber link cost nearly twice as much as a proposed 23-GHz microwave radio system supporting four T-1 channels, but it has six times greater capacity, according to Chris Cagle, who is a network planner for Sun Trust Services.

With 24 unused T-1s, the fiber system can easily support additional voice and data links. Those links would be needed if the bank moves ahead with a proposal to double the size of its operations center within the next three years, Cagle said.

The excess capacity will also enable the bank to place IBM check-sorting equipment in the operations center. This equipment would be linked via fiber-optic IBM 3044 channel extenders to an IBM mainframe in the data center.

The system also gives the bank the ability to install IBM 9370 minicomputers in its operations center and link them to the mainframe.

By going with the fiber link, the bank also avoided spending the \$25,000 to \$30,000 required to install a T-1 multiplexer and channel bank equipment needed to support four leased T-1 lines. Those leased lines would cost an additional \$3,500 per month, or \$42,000 a year.

"Even though our buildings are only a few thousand feet apart, leased T-1 service was fairly expensive," Cagle said. "The fiber

system cost more than the microwave or leased T-1s, but in the long run we will, at the very worst, break even. We could even wind up saving money if the operations center is expanded or the need for additional T-1s between the buildings arises."

The link, installed by Martin Marietta Data Systems' Fiber Optic Systems Group, has operated as well as Sun Trust Services managers expected. Based on its experiences with the fiber system, the company may install additional private fiber links between Sun Bank or SunTrust buildings located close to each other, according to Cagle.

Two of the four T-1 lines currently operating over the fiber link carry voice traffic between an AT&T System 75 private branch exchange in the operations center and an AT&T System 85 PBX in the data center. Another links a mix of terminals and terminal controllers in the operations center to various hosts in the data center. That data link enables workmen in the data center to operate heating, air-conditioning and security control systems located in the operations center.

The fourth link transmits one-way video images from security cameras in the operations center to a security post in the data center.

The point-to-point link consists of a Telco Systems Fiber Optics Corp. 828F M-13 multiplexer and a D424 channel bank from ITT Telecom Network Systems Division that supports data channels oper-

ating at up to 56K bit/sec.

The fiber system also supports The Grass Valley Group, Inc.'s Wavelink one-way video system.

Cagle said the system's two T-1 voice links support a total of 48 digital, 64K bit/sec E&M trunk lines. The trunk lines enable users attached to the System 75 in the operations center to access outside telephone lines and Sun Trust's private electronic tandem network (ETN) via the System 85 in the data center.

That System 85 is linked via leased T-1 lines to a System 85 in a downtown Orlando Sun Bank. The downtown System 85 is one of three nodes in Sun Bank's private Sun Dial ETN network. The other two are located in Tampa and Fort Lauderdale.

The system's lone data link is split into nine channels, five of which connect IBM 3274 terminal controllers to an IBM 3725 front-end processor. Two of the controllers operate at 56K bit/sec, while the others operate at 9.6K bit/sec.

For the most part, IBM terminal users in the operations center require periodic access to customer files on the mainframe.

Another 9.6K bit/sec channel on that link is shared between NCR Corp. and IBM teller terminals needing connection to NCR or IBM hosts.

Those terminals are used for teller training or terminal troubleshooting, Cagle said.

Administrative personnel in the operations center using Tandem Computers, Inc. terminals are linked via another 9.6K bit/sec channel to a Tandem NonStop minicomputer in the data center.

This minicomputer runs Sun Bank's Florida automated teller machine network. Users of Tandem terminals can retrieve ATM usage statistics from the minicomputer.

The last 9.6K bit/sec channel on the link enables an AT&T 3B2 microcomputer in the operations center to link to an AT&T 3B5 minicomputer in the data center.

The 3B5 collects station message detail recording files from the more than 50 System 75s located in Sun Bank branches in Florida. It also collects ETN network usage statistics from three System 85 ETN nodes in Florida. The 3B2 in the operations center is able to access those files to prepare reports.

While Sun Trust Services network operations personnel are able to monitor the status of the fiber-optic link, the bank has contracted with Martin Marietta to provide maintenance.

"With only a quarter-mile of cable, there is no need for us to build a fiber-optic maintenance staff," Cagle said. "It will be cheaper in the long run to just trust that maintenance to Martin Marietta."

Although it is using a system with the capacity of T-3, the bank does not currently have enough traffic to support leased 45M bit/sec T-3 service between its branch sites. Nor does it plan to use leased T-3 service.

If ETN traffic increases, Cagle said he will likely propose the use of digital voice compression techniques — such as adaptive differential pulse code modulation — which would double the number of voice circuits a T-1 line can support. □

Telex endorses Memorex bid

continued from page 3

Telex also markets printers, tape drives, workstations and, since it acquired United Technologies Communications Co. in January 1986, private branch exchanges. Analysts said the company has its largest customer bases in the insurance, airline and automotive industries.

Telex has 8,000 employees. In its 1987 fiscal year, it reported revenue of \$840 million and net income of \$77 million. In November 1986, Telex entered the IBM System/3X series market with a line of display terminals and printers. The line has not sold as well as hoped, IDC said.

London-based Memorex, a former subsidiary of Burroughs Corp. that became independent in December 1986 after a group of managers conducted a leveraged buyout, had 5.2% of the U.S. 3270 market in 1986. The company's products have sold well in Western Europe, where Memorex derives about 60% of its revenue, according to Ilene Goldman, technology analyst at Smith Barney, Upham Harris & Co, Inc. It employs 5,600 people and estimates its 1987 fiscal year revenue at more than \$1 billion, with operating profit of \$150 million.

Memorex's product line, aimed at 3270 and System/3X environments, also includes large-system storage devices such as 3380-class disk and tape drives, solid-state storage devices, Personal Comput-

er-compatible workstations, printers and 3270 controllers.

After the Telex/Memorex negotiations became public last week, Edelman said in a letter to the Telex board of directors that he would consider upping his stock tender offer. Originally, Edelman offered \$65 a share, but he lowered his bid to \$55 a share, or a total of \$808.5 million, after the stock market crash of Oct. 19. Edelman's current ownings include Datapoint Corp. and Intellogic Trace, Inc.

"There is a fear that Edelman would splinter off portions of the

"There is a fear that Edelman would splinter off portions of the company and sell them."

company and sell them to help finance the acquisition," said Joe Wagner, display terminals industry analyst at San Jose, Calif.-based Dataquest, Inc.

Telex would prefer acquisition by Memorex because the companies' product lines could be merged smoothly and some of the aggressive pricing competition that exists in the 3270 market today could be avoided, analysts said. In addition, a merger would match Telex's strength in the U.S. with Memorex's strength in Europe. "From a tactical sense, it certainly makes sense. They're direct competitors,"

said Jim Poyner, an analyst with Dallas-based Rauscher Pierce Refsnes, Inc.

The future is not glowing for either company because the 3270 terminals that both companies sell are designed to work exclusively with the eight-bit EBCDIC code IBM uses in its 370-architecture computers. The mainframe market is growing at only 5% to 8% per year, according to IDC, and users are increasingly employing Personal Computers equipped with terminal-emulation boards, rather than buying terminals.

IBM recently introduced a new 370-architecture minicomputer, the 9370, but the machine's built-in versatility may be a problem for 3270 terminal sellers. "Even though the 9370 does support the 3270-type terminal, the way the terminal is designed, you can also run an ASCII device. So you could easily use an ASCII terminal or PC and just get software to get the communications in sync," Smith Barney's Goldman said.

The major stumbling block before the proposed acquisition could be completed would be for Memorex to obtain the necessary financing. "For them to take on Telex, it's a little over \$900 million, so they're looking at between \$1.3 billion and \$1.4 billion dollars in debt. It's a big question whether some kind of financial institution will want to participate," Goldman said. "If you look at the merger, there is definitely synergy, but if you look at the balance sheet, it's not too attractive." □

RBHCs review holdings

continued from page 2

project succeeds, Ameritech and David Systems could license the technology to other telecommunications companies, such as the other RBHCs. To do so now would require a waiver of the manufacturing ban from Greene. With the second option, Ameritech could convert those license fees into an equity interest in David Systems, Brand explained. This would also now require a waiver.

Up until late October, BellSouth Corp. held a 50% equity interest in FiberLAN, the Research Triangle Park, N.C.-based maker of fiber-optic local networks and long-distance transmission systems. Possibly anticipating Greene's tack on manufacturing and research, it restructured that interest.

Now, according to an internal BellSouth memorandum, "FiberLAN is being restructured as a fully owned entity of Siecor, Inc., BellSouth Enterprises, Inc.'s partner in the joint venture.

"Though FiberLAN is a good company and fits our strategic plan of participating in businesses closely related to our core business, it can be more effective in meeting total marketing opportunities if it operates without any of the limitations imposed by the MFJ," said W.O. McCoy, president of BellSouth Enterprises, as quoted in the memo.

Pacific Telesis Group has already suspended field trials of its Project Victoria venture, but Greene's ruling could end the program entirely, said William Adler, executive director of regulatory matters at Pacific Telesis.

Project Victoria involves the use of Pacific Telesis-developed multiplexing to transmit voice and data calls over standard copper twisted-pair wire. "We halted the field trials because it just wasn't feasible to continue, given the uncertainty associated with the regulatory environment," Adler said. "We could ask Greene for a waiver to continue this project; we could appeal Greene's definition of manufacturing; or we could halt the project."

Greene's ruling won't halt US West, Inc.'s plans to build a multi-million dollar R&D facility in Colorado. Last week, US West Advanced Technologies, Inc., a US West subsidiary, announced it would locate the new facility in Boulder. The firm said the software development it plans to do there does not violate the Modified Final Judgment.

Southwestern Bell Corp. is looking at its various technology divisions to see if they violate the manufacturing R&D restriction.

"Those divisions ensure that we are on the leading edge of telecommunications technology," said Southwestern Bell spokesman Alan Northcutt. "We're studying the specific impact of the judge's ruling on these and other areas."

Both Nynex Corp. and Bell Atlantic Corp. said the order will not have any immediate impact on current businesses. □

New Nynex unit serves big users

continued from page 1

"Our customers have long been telling us it was important for them to have a single point of contact in order to purchase local telecommunications services, information systems and telecommunications equipment," Sacco said.

"We want to be able to provide clients with total systems solutions as far as we are allowed under current federal regulations," he said. "While we can't provide long-distance service, we can sell local service, mobile telephones, computers, software, private branch exchanges and telephones. It's our intent to offer all of these options to our business customers under an account management system."

Nynex can jointly market network services and equipment sales as the result of the Federal Communications Commission's 1986 Third Computer Inquiry ruling. In that ruling, the agency said regional Bell holding companies could sell local telecommunications services and customer premises equipment through an unregulated subsidiary.

Nynex is not the first RBHC to take advantage of this regulatory flexibility. US West Information Systems, Inc. was formed earlier this year as an unregulated subsidiary providing customer premises equipment and network services to large and small business customers in US West, Inc.'s 14-state region.

Under the account management system, NSM will employ 155 salespeople, each of whom will specialize in a particular vertical industry such as the financial, health care, retail or government markets.

"The segmentation of the sales force will allow us to specialize and concentrate on the specific business needs of individual clients," Sacco said.

The particular vertical markets outlined by Sacco were chosen because of their predominance in Nynex's business region, which includes New York, Massachusetts, New Hampshire, Vermont, Maine, Rhode Island and parts of southern Connecticut.

A wise move

Analysts applauded Nynex's creation of NSM. "This is a very wise move, given the makeup of Nynex's operating territory," said Frank Dzubeck, president of Washington, D.C.-based consulting firm Communications Network Architects, Inc.

"Nynex needs to be providing the very largest businesses in New York and Boston with total information systems, the way IBM's Information Systems Group does," Dzubeck said.

"Otherwise, Nynex is going to lose a tremendous amount of systems business to integrators and

transmission business to bypass providers," he added.

Dzubeck and others said creation of the new marketing group is an indication that Nynex is becoming more aggressive in marketing to large users and in trying to lock them into long-term business relationships.

Mark Winther, an analyst with Link Resources, Inc. in New York, said, "It's very difficult to sell only one product to a large customer. The big clients want to deal with vendors who can supply all their systems needs."

NSM plans to increase its sales force to 300 members by 1989. "We wouldn't be planning to increase the sales force unless we thought this business was going to grow," Sacco said.

Sacco said formation of NSM is not a dramatic change of direction for Nynex but a continuation of the company's evolution toward becoming a full-service telecommunications provider — an evolution that began after divestiture.

"We are further refining and focusing our sales and marketing efforts, which are critical to our success in the increasingly competitive environment we're operating in," he said.

While Sacco declined to estimate the anticipated growth in network services and equipment sales that will result from this new marketing effort, he said he expects NSM to contribute substantially to Nynex's overall growth. □

IBM claims sales soar

continued from page 1
lysts buttressed. The company also repeated earlier pledges to develop higher speed versions of the network and to enhance the product's network management capabilities.

Increased Token-Ring demand appears to be fueled by the nation's largest customers. William Mandulak, ISG manager for establishment product marketing, said that 85% of the Fortune 250 companies have installed at least a pilot Token-Ring Network and many are installing networks with more than 1,000 nodes.

These users see the Token-Ring as a key component in a networking scheme to weave microcomputers, minicomputers and mainframes into a cohesive system, Mandulak said. During the past 12 months, IBM began shipping products that allow the Token-Ring to be connected to a broad range of products.

One reason for Token-Ring's success with large companies is that such users see it as a more reliable transport mechanism than Ethernet, according to Doug Gold, industry analyst at International Data Corp., a market research firm in Framingham, Mass.

Mandulak said IBM plans to unveil a 16M bit/sec version of the Token-Ring Network by the end of next year. Analysts expect the 16M bit/sec network to act as a backbone network, connecting circles of Token-Ring Networks.

Another plus for IBM is that token-passing technology is used with the Fiber Distributed Data Interface (FDDI), a standard for fiber networks operating at a speed of 100M bit/sec. "We see a need for high-speed transmission and are

actively working with FDDI standards committees," Mandulak said. With large customers sculpting corporate networking plans, orders for Token-Ring adapter cards grew dramatically and supply lagged well behind demand. "We increased production three or four times during the year but were unable to meet demand," Mandulak said. He said the company plans to double production next year.

IBM was not the only company that significantly underestimated market demand. William Redman, program director for local-area communications services at Gartner Group, Inc., a market research firm in Stamford, Conn., said sales of local network hardware and software grew from \$1 billion in 1986 to \$1.7 billion this year. He predicted that sales will increase to \$3.3 billion in 1990.

IBM appears well-positioned to capture a larger chunk of the growing market. As customers tie local networks into enterprisewide networks, gateways become a more important purchasing consideration. IBM has a broad line of well-designed gateways, such as one that links a Token-Ring Network to a System/36.

Network management is another item that is increasing in importance. Mandulak said the company will enhance its network management products so that information about problems with a network server can be sent to NetView.

Even though sales of Token-Ring adapter cards are increasing, IBM lags well behind competitors in the network software market. "Vendors such as Novell, [Inc.] and 3Com [Corp.] are eating IBM's lunch in the software market," Redman said.

IBM is taking steps to gain a larger chunk of that market. In

April, the company announced OS/2 Extended Edition (EE), a version of the operating system used on the Personal System/2 line. OS/2 EE supports a variety of communications functions.

Since the announcement, IBM, Microsoft Corp. and Novell have battled for leadership of the network software market. The battle has left users concerned about their ability to move application software easily from one net operating system to another (See "Novell details OS/2 support" page 1).

Bart Stuck, vice-president at Probe Research, Inc., a market consulting firm in Morristown, N.J., said those concerns are unwarranted. IBM wants to make Advanced Program-to-Program Communications the dominant way of connecting computer systems. Competitors are pushing Network Basic I/O System, which is currently used by most of the network applications. Stuck predicted that Microsoft and Novell will eventually add APPC support to their network software, and IBM will continue to support NETBIOS.

Analysts suggested that IBM has a proprietary trick hidden up its OS/2 EE sleeve, which includes data base capabilities as well as communications software. IBM could develop applications software that tightly integrates OS/2 EE's data base and networking capabilities. Since OS/2 EE would be a proprietary product, competitors would have difficulty matching IBM's capabilities.

Mandulak said IBM has already published all interfaces needed to develop application software. "Our networks are open and conform to industry standards," he said. "Our advantage comes only if we do a better job of designing our products than our competitors do." □

CALENDAR

Dec. 16-18, St. Louis — Troubleshooting of Data Communications Networks. Contact: American Institute, Inc., Carnegie Building, 55 Main St., Madison, N.J. 07940.

Jan. 4-6, Washington, D.C. — Telecommunications Traffic Engineering. Contact: George Washington University, School of Engineering and Applied Sciences, Washington, D.C. 20052.

Jan. 4-8, Chicago — AT&T Networking Products Overview. Contact: AT&T Corporate Education and Training, P.O. Box 1000, Hopewell, N.J. 08525.

Jan. 11-15, Irvine, Calif. — ISDN Week. Contact: Teledimensions Systems Corp., 21552 Shillingsburg Ave., San Jose, Calif. 95120.

Jan. 14-15, Seattle — Networking the IBM Personal Computer, XT and Compatibles. Contact: Data Tech Institute, Lakeview Plaza, P.O. Box 2429, Clifton, N.J. 07015.

Jan. 18-21, Tampa, Fla. — 16th Annual BICSI Conference. Telecommunications Distribution Design in Buildings. Contact: BICSI, University of South Florida, LLL 012, Tampa, Fla. 33620.

Jan. 19-20, Chicago — Understanding ISDN. Contact: Telecommunications Research Associates, P.O. Box 1200, Newark, Ill. 60541.

Jan. 20, New York — Corporate PC Data Communications and Connectivity. Contact: Access Data Products, Inc., 559 Gramatan Ave., Mount Vernon, N.Y. 10552.

Jan. 25, Washington, D.C. — Communication Networks Conference and Exposition In-Depth Seminar Curriculum. Contact: Communication Networks '88 In-Depth Tutorial Program, P.O. Box 9171, Framingham, Mass. 01701.

Jan. 26-27, Somerset, N.J. — Data Comm I, Data Comm II. Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

Feb. 3-5, Milwaukee — Working with Personal Computer Local-Area Networks. Contact: Center for Continuing Engineering Education, University of Wisconsin-Milwaukee, 929 N. Sixth St., Milwaukee, Wis. 53203.

Feb. 8-10, Boston — X.25 in Practice. Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

Feb. 8-10, Washington, D.C. — Introduction to Data Communications. Contact: Systems Technology Forum, 10201 Lee Highway, Fairfax, Va. 22030.

Network World Sales Offices

BOSTON
Donna Pomponi, District Manager
375 Cochituate Rd., Box 9171
Framingham, MA 01701-9171
(617) 879-0700
NEW YORK
Paul Bonington, District Manager
Paramus Plaza 1, 140 Route, 17 North
Paramus, NJ 07652
(201) 967-1350
NEW JERSEY/PHILADELPHIA
Joan Daly, Eastern Regional Manager
Paramus Plaza 1, 140 Route, 17 North
Paramus, NJ 07652
(201) 967-1350

WASHINGTON, D.C.
Bill Burke, District Manager
2133 Defense Highway, Suite 205
Crofton, MD 21114
(301) 721-4765/4763
SAN FRANCISCO
Chris Clyne, Western Regional Manager
3350 West Bayshore Rd., Suite 201
Palo Alto, CA 94303
(415) 328-4618
ATLANTA
Tom Tolbert, District Manager
1400 Lake Hearn Dr., Suite 330
Atlanta, GA 30319
(404) 394-7509

CHICAGO
Fran Jonikaitis, District Manager
10400 West Higgins Rd., Suite 300
Rosemont, IL 60018
(312) 297-8855
LOS ANGELES
David Pronenko, District Manager
18004 Sky Park Cir., Suite 100
Irvine, CA 92714
(714) 250-3006
CLASSIFIED ADVERTISING
Joan Bayon Pinsky, Account Executive
375 Cochituate Rd., Box 9171
Framingham, MA 01701-9171
(617) 879-0700

CW Publishing/Inc.

An IDG Communications Company

James S. Povec/President

Network World Headquarters: 375 Cochituate Road, P.O. Box 9171, Framingham, MA 01701-9171, Phone: 617-879-0700, Telex: 95-1153, FAX: 617-875-8931

Pam Valentinas
Manager/Marketing & Sales Operations

Karen Wallace
Senior Account Coordinator
(617) 620-7789

Barbara Hill
Account Coordinator
(617) 620-7782

Richard Priante
Circulation Manager
(617) 620-7734

Robert W. Wescott
Distribution Manager

Leigh Hometh
Senior Production Manager

IDG Communications/Inc.

Patrick J. McGovern
Board Chairman

Axel Leblois
Chief Executive Officer

William R. Murphy
Vice President Finance

Network World is a publication of IDG Communications, the world's largest publisher of computer-related information. IDG Communications publishes over 90 computer publications in 33 countries. Fourteen million people read one or more IDG Communications publications each month. IDG Communications publications contribute to the IDG News Service offering the latest on domestic and international computer news. IDG Communications publications include: ARGENTINA'S Computerworld Argentina; ASIA'S Communications World, Computerworld Hong Kong, Computerworld Malaysia, Computerworld Singapore, Computerworld Southeast Asia, PC Review; AUSTRALIA'S Computerworld Australia, Communications World, Australian PC World, Australian Macworld; AUSTRIA'S Computerwelt Oesterreich; BRAZIL'S DataNews, PC Mundo, Micro Mundo; CANADA'S Computer Data; CHILE'S Informatica, Computacion Personal; DENMARK'S Computerworld Danmark, PC World Danmark; FINLAND'S Mikro, Tietoviikko; FRANCE'S Le Monde Informatique, Distributique, InfoPC, Telecoms International; GREECE'S Micro and Computer Age; HUNGARY'S Computerworld SZT, PC Mikrovilag; INDIA'S Dataquest, ISRAEL'S People & Computers Weekly, People & Computers Biweekly; ITALY'S Computerworld Italia; JAPAN'S Computerworld Japan; MEXICO'S Computerworld Mexico; THE NETHERLANDS' Computerworld Netherlands, PC World Benelux; NEW ZEALAND'S Computerworld New Zealand; NORWAY'S Computerworld Norge, PC World Norge; PEOPLE'S REPUBLIC OF CHINA'S China Computerworld, China Computerworld Monthly; SAUDI ARABIA'S Arabian Computer News; SOUTH KOREA'S Computerworld Korea, PC World Korea; SPAIN'S CIMWORLD, Computerworld Espana, Commodore World, PC World Espana, Comunicaciones World, Informatica Industrial; SWEDEN'S ComputerSweden, MikroDatorn, Svenska PC World; SWITZERLAND'S Computerworld Schweiz; UNITED KINGDOM'S Computer News, DEC Today, ICL Today, LOTUS, PC Business World; UNITED STATES' Amiga World, CD-ROM Review, CIO, Computer Currents, Computerworld, Computers In Science, Digital News, Federal Computer Week, 80 Micro, FOCUS Publications, InCider, Infoworld, Macintosh Today, Macworld, Computer + Software News (Micro Marketworld/Lebhar-Friedman), Network World, PC World, Portable Computer Review, Publish!, PC Resource, Run, Windows; VENEZUELA'S Computerworld Venezuela; WEST GERMANY'S Computerwoche, Information Management, PC Welt, PCWoche, Run.

Another in a series of CLEO user applications

"CLEO proved to be THE superior choice in our search for a vendor providing communications for electronic transfer of returns directly to the IRS."

CLEO has been providing solutions to remote sites communication problems for years. Here is a typical example:

"... There were many vendors who wanted us to transmit returns to them for re-transmission to the IRS, but they charge a premium for EVERY return! We wanted someone to help us file DIRECTLY to the IRS. CLEO helped us accomplish just that, and was certainly the most reasonably priced."

"CLEO has shown a remarkable ability to adapt to the IRS's changing requirements."

"The CLEO documentation is outstanding. We installed the card and the 3780Plus software with no problems. It was a snap."

"CLEO is the ONLY communications we are recommending to our customers. And we recommend it without reservation. CLEO gets our vote, hands down."

Phil Drake, President
Drake Enterprises, LTD
Franklin, NC

Remote Sites Communication

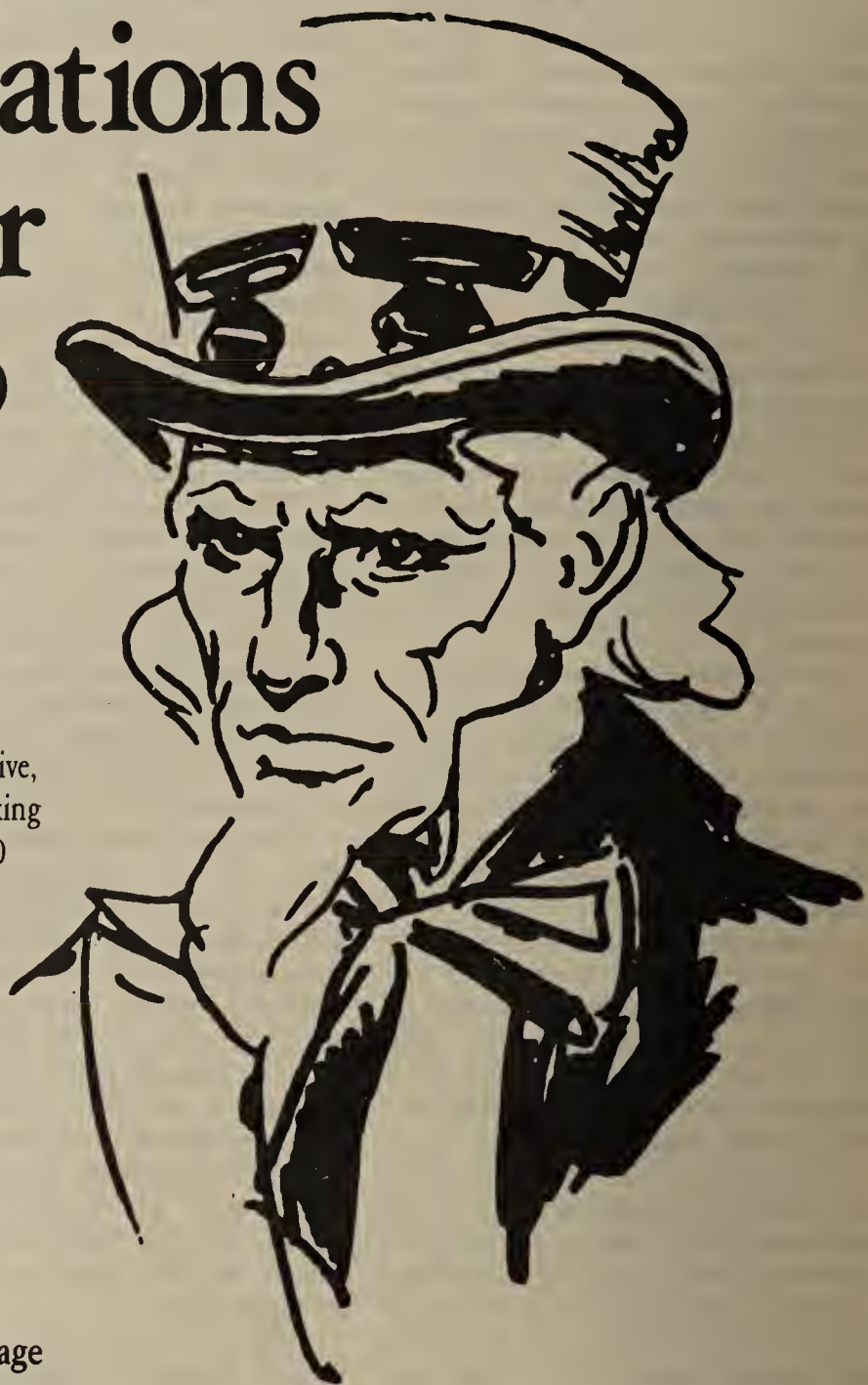
Whatever your industry, your remote computers need to share information with your mainframe. Or, they need to exchange data with other remotes. In either case, you need a total solution at the remote sites. You need software, hardware interfaces and modems that all work together smoothly. You need CLEO!

CLEO software products allow microcomputers to communicate with minicomputers and mainframes, and to emulate their workstations. Since 1981, CLEO has provided remote communications

between micros and mainframes for the automotive, insurance, medical and banking industries. Today over 66,000 CLEO users worldwide are running on all major brands of microprocessors. The greatest number of these users run CLEO software on IBM Personal Computers and NETBIOS LANs.

Complete Software/Hardware Package

Every CLEO package contains all the software and hardware accessories needed at the remote site. Your selected CLEO, SNA or BSC software is packaged with 1) an internal modem card for dial-up applications, or 2) an interface card and cable for use with your existing modem. There's no waiting for non-CLEO add-ons.



And, you get prompt, single-source service. Package prices range from \$795.00 for most standalone packages, up to \$1,995.00 for the 32-user SNA gateway.

Call us today to discuss your application.

CLEO Software
1639 North Alpine Rd.
Rockford, IL 61107
Telex 703639
FAX 815-397-6535

Headquarters:
USA: 800/233-CLEO (2536)
Illinois: 800/422-CLEO (2536)
International: 815/397-8110

Mexico City: 203-0444
Canada, East: 800/361-3185
Canada, West: 800/361-1210
Canada, Montreal: 514/737-3631



CLEO

CLEO and 3780Plus are registered trademarks of CLEO Software.
IBM is a registered trademark of International Business
Machines Corporation.